Railroad Age Gazette

Including the Railroad Gazette and The Railway Age

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We print this week the first instalment of a rather comprehensive paper on the physical aspects of the British railway system. Much of what the author writes will be familiar to most of our readers, but we believe a general round-up of present-day British practice by a trained observer will be found interesting, even by people who have seen the British railways at work and have had an opportunity to note some of the curious differences of practice, as compared with that to which they are accustomed.

The New York State Public Service Commission, Second District, has granted the petition of the New Jersey & New York Railroad to discontinue its station at Union, Rockland County, but the grant has a number of strings attached to it. The company is required to deliver carload freight at Union without extra charge; also L. C. L. freight where it is of such a character that it will not be likely to be stolen or suffer injury; to keep the station open, clean, lighted and heated during the time that passenger trains arrive and depart, and to stop all passenger trains at said station that are scheduled to stop there at this time. In other words the agent may be dismissed provided the company can arrange to have his most essential duties performed by someone else. The station will have to be unlocked immediately prior to the arrival of each train, and it ought to be locked after the train has passed. This can be accomplished easily by the signal department, by means of an electric lock, controlled by the operator at the nearest signal cabin. To keep the building warmed will be a little more expensive, but a three-inch pipe from the nearest station, with an all-electric automatic temperature regulator ought to do the trick. If electro-pneumatic block signals are in use on that line, no special pipe would be necessary, as the signal pipe would answer. What could be neater than a waiting room warmed by heated compressed air? The mental agitation of the signal maintainer might furnish all necessary heat not already developed by the compressor. At night, when trains are infrequent, the air pipe could be exhausted, the compressor reversed, and the pipe used as a vacuum cleaner to comply with the commission's order to keep the waiting-room floor in tidy condition.

Like Sherlock Holmes' friend, Dr. Watson, one is inclined to exclaim, "How simple! How is it that it did not occur to me!" when one reads the abstract of the opinion of the Supreme Court in the Commodities Clause case, printed on another page of this issue. By defining the meaning of the words "interest in" the Supreme Court cuts the ground from beneath the feet of the government attorneys and the attorneys for the railways as well. Apparently no railway company is prohibited by the Commodities Clause, as interpreted by the Supreme Court, from carrying coal belonging to a corporation the capital stock of which is owned by the railway company; that is, the words "interest, direct or indirect" are simply interpreted in the same sense that courts have interpreted them over and over again in the past. The court holds, it seems, that when the railway company has parted with all right to say what the disposition of the coal shall be, it no longer has any interest direct or indirect in the product. The two chief reasons that underlay the agitation for the Commodities Clause were, first, that the railway company made an extra profit by carrying its own coal to tidewater at a rate which did not have to be made public; second, and this reason chiefly urged by the Interstate Commerce Commission, that railways discriminated against others shippers so as to favor the movement of their own coal. The Commodities Clause as now interpreted will prevent both of these abuses as far as any law could do, and yet it does not irreparably injure the legitimate business of the railway company, as an enforcement of the interpretation put on the clause by the government attorneys might have done.

PREMIUMS TO TRAINMASTERS.

The *Railroad Age Gazette* will pay seventy-five dollars, under the conditions named below, for the best article on how to be a first-class trainmaster; fifty dollars for the second best article, and at its regular rates for any other articles accepted. The trainmaster—by which we mean the superintendent's chief assistant or assistants in dealing with station men and trainmen—is or should be the wheel horse of the operating team. He occupies a critical position, for he must take up varied responsibilities for which usually he has had little training, and for the first year must grow rapidly. We hope by this offer to give wide circulation to the best ideas of the men who have most thoroughly studied the duties of the position.

CONDITIONS.

1. The author must have had at least one year's experience in the position of trainmaster (or an equivalent position, whatever its name); must have had this within three years past, and must send with his paper a brief account of his experience and schooling; also say in what state or states he has lived.

2. The author's name and address should be sent in a separate sealed envelope.

3. The paper must not be less than 1,000 words long, nor more than 4,000 words. It must be typewritten.

4. All papers must be in our hands by July 15.

SUGGESTIONS.

Give facts, and be sparing of generalities; the generalities are pretty well known. But your theories will be interesting, provided you can illustrate them cogently from experience.

Do not be afraid to illustrate with accounts of actual occurrences on your own road; you can disguise names and dates if compelled to.

EFFECTIVE WORK BY THE BUSINESS ASSOCIATION.

Perhaps it would not be exaggerating to say that the appearance of the railway supply manufacturers of Illinois before a joint session of the two houses of the legislature of that state on April 29, that was convened expressly to give them a hearing, marked an epoch both in railway regulation and in the relations between the supply manufacturers of the country and the railways. The supply men did not go before the legislature as a tail to the railway kite. They hired a special train, paid the same for it as any other party would have to pay, and went to Springfield to ask the postponement of further legislation affecting railways to a time when business shall be less unsettled. Their spokesmen, Mr. Mulliken and Col. Post, did not oppose all regulation of railways, but conceded that reasonable regulation is necessary. They did not speak for the railways but for those who are making supplies for the railways, and their employees, who have been hurt worse by anti-railway agitation and legislation than even the roads themselves.

Probably the lawmakers of Illinois never before had brought forcibly to their attention the fact that there is a great branch of industry that is entirely independent of the roads in ownership and management, and yet is absolutely dependent on their prosperity for its prosperity. They had been used to hearing about railway matters only from shippers, representatives of railway labor, and representatives of the railways. Few of them knew before that the railway supply manufacturing business in Illinois is larger than in any other state, and represents many millions of invested capital and gives employment to probably 200,000 men. The statement to them of facts such as these made an obvious impression.

The plans for the demonstration, which were made by A. H. Mulliken, were perfect and perfectly carried out in every detail. Mr. Mulliken's brief talk to the legislature was that of a broad, sane, big business man, actuated not merely by private interest but by both private and public interest. Col. Post's speech was a model of eloquence, tact, and sound logic and good sense. The effect should be good, not only in Illinois but in other states.

After the delegation appeared before the legislature, it called on Governor Deneen. In a brief talk the governor made some statements about regulation of railways that were only too true and that indicated why so much railway regulation has been unwise and harmful. He said that at every session of the legislature shippers and railway employees come asking for legislation. The railways are represented at the capital by legislative agents who have nothing to do with shaping the policy of the roads, and can therefore only oppose measures that others suggest. Their attitude necessarily is always negative, never positive. He thought that if the executive officers of the roads and men of affairs, such as those composing the supply men's delegation, would take the time and trouble more frequently to come to the capital themselves, to present fully facts showing why proposed measures were unfair or dangerous and should be defeated, or how they could be modified so as to make them fair and beneficial, much fewer positively bad laws would be passed and the laws that were passed would be much better and fairer. Gov. Deneen's remarks gives the point of view of the public man—of the politician, if you please—and are well worth heeding. The responsibility for vicious regulation affecting large corporate interests, like all other bad government, lies not only on those who seek to get vicious laws passed, but also on those who do not do what they can to prevent their passage. It is all very well to denounce politicians, but before business men indulge in this popular pastime they should be sure they are doing their own duty more intelligently and more courageously than the politicians are doing theirs.

A more important work than enlightening legislatures that needs to be done is that of educating public sentiment. This is clearly recognized by those who have organized and are directing the energies of the Railway Business Association; and there can be no doubt that its educational work will tend not only to prevent much action hostile to railways during the present sessions of the legislatures, but to cause fewer legislatures to be elected in the future that will be disposed to attack the roads to make a politicians', shippers' and labor agitators' holiday.

EMERGENCY TELEGRAPH LINES FOR RAILWAY SERVICE.

The interruption to traffic between Philadelphia and Washington on the fourth of March last, keeping hundreds of eastern people away from the presidential inauguration, was one of the most notable incidents of the kind on record. Snow and sleet have many times destroyed more poles and wires, no doubt; but not often are there so many people to whom a short delay means so much disappointment and loss as was the case on this occasion. As railway managers usually seem ready to go to any expense necessary. no matter how large, to prevent delays, however small, on busy trunk lines, everybody wonders why, after lessons like this, every railway company north of Mason and Dixon's line does not at once lay underground wires the whole length of its lines; and as they do not seem inclined to do so, numerous editors and other persons arise to print good advice. The fact seems to be that the losses and inconvenience which result from a day's interruption of telegraphic communication do not count up so seriously when one sits down afterward and coolly considers them. After a brief isolation of the city of Philadelphia a few years ago the officers of the Pennsylvania Railroad considered carefully the project of laying an underground telegraph from that city to New York, but they decided not to do it. Judging by the general policy of that company, it is fair to assume that this decision was not due to mere stinginess, but rather to a deliberate judgment that the large sum of money necessary to lay 90 miles of underground telegraph could be made to do more good for the public if used in other ways. In such a situation an underground line would lie unused until the next disaster to the pole line, for messages can be sent so much faster on lines which are strung on poles that no one would think of using the underground when not compelled to do so.

There is one important feature, however, in which the Pennsylvania lines can be and probably now will be improved. Poles should be set far enough from the track so that if they fall they will not obstruct the path of trains. The proper place for poles is at the edge of the right of way. Where the right of way is too narrow for this, extraordinary precautions should be taken. Railway lines where the poles are thus set back present a much improved appearance.

Another precaution which might often prevent or greatly reduce delays would be to have means constantly at hand for quickly establishing emergency telegraph lines; and in this connection the reader will be interested in a letter which we have received from Major C. McK. Saltzman, of the signal corps of the army, as follows:

"The violent storm which occurred in the eastern states

early last month (*Railroad Age Gazette*, March 12, page 515), blowing down miles of poles and wires and seriously hampering railway travel, suggests the usefulness of the Signal Corps telegraph system on railways.

"When troops of the army engage in field service under modern conditions, it is no longer possible to send orders and messages by means of messengers or orderlies. The modern game of war is played fast. The Signal Corps of our army therefore has devised plans for rapidly laying field wires on the ground which can be operated either by telephone or telegraph. The Signal Corps uses two types of wire for this purpose. Its best type, known as "field wire" consists of ten small steel and one copper wire twisted together and covered by a tough insulation. The steel wires are each about .012 in. diameter, while the copper wire is No. 21, B. & S. The twisted wires are held together by a light serving of cotton, outside of which is a seamless compound of rubber having a thickness of .024 in. The rubber insulation is protected by an outer serving of closely woven braid of cotton. The completed wires are only about ⅛ in. in diameter. This wire is very pliable and weighs but 75 lbs. to the mile. It is carried on automatic carts drawn by two horses or mules, and the wire can be laid on the ground at a trot or gallop. The carts are so built that the wire can also be reeled up at a rapid gait. The insulation on the wire is tough and is not rendered unserviceable by troops and wagons passing over it. Communication is maintained over these wires by means of a valuable little instrument known as the "buzzer," which combines both the telegraph and telephone. This instrument can maintain communication over lines of very high resistance and has been used in sending telegrams over stretches of good barbed wire fence* and over short distances where railway track was used instead of wire.

"In addition to this "field wire" the Signal Corps has a lighter type of wire known as "buzzer wire" for emergency use. This consists of two steel wires and one copper wire, each having a diameter of .012 in. twisted together and covered with a double wrap of cotton and impregnated with an insulating compound. The wire is put up on spools containing one-half mile. These spools can be carried by a man mounted on a horse, and by means of a hand reel the wire can be paid out at a trot or gallop. This wire is only used in emergency when field wire is not available or for use on short distances of ground over which the large wire carts cannot be taken.

"Excellent results have been secured by the army in maintaining communication over these field lines and the great speed with which they can be laid, suggests that the scheme would be of benefit to railways for emergency use. Suppose several miles of telegraph line were suddenly destroyed; if a large reel of this army field wire were mounted on a hand car, or a flat car, or even on an engine tender, a wire could be laid along the right of way at a rate of about twelve miles an hour. Any number of wires could be so laid simultaneously from a number of reels. Upon the reconstruction of the permanent telegraph lines, the field wire lines could be taken up at a rapid rate. By the use of this type of field wire, the army has practically dispensed with the need for poles."

There would be numerous obstacles to the use of such a method on a railway line having many side tracks, junctions, and highway crossings, and it seems likely that the satisfactory experience of the army could not wholly be repeated; but the scheme is well worth consideration, even if not universally applicable. When a railway's telegraphs are in such a bad condition as to require the services of all its linemen for two or three days to re-establish only the most essential lines, an insulated line that would work while lying on the ground would be greatly appreciated, even if it could be laid over only a part of the disturbed territory.

*A railway in the southwest, in building recently some long stretches of wire fence, soldered the joints in the top wire, so as to make it a continuous electrical conductor; this with a view to its possible usefulness as an emergency wire for communication.—EDITOR.

NEBULOSITIES OF THE SHERMAN ACT.

Attorney-General Bonaparte, on surrendering office at the close of the last federal administration, gave out to the press a mock will and testament in which he recited the anti-trust suits bequeathed to his successor. That successor, Mr. Wickersham, has lately and officially refused full acceptance of the Bonaparte legacies. He does not, to be sure, reject them *en bloc*. But he admits, in the words of the press report, that "Some suits were instituted and some prosecutions commenced without sufficient consideration and without adequate cause," which suits the new administration will not hesitate to dismiss while "it will not abandon the splendid work of the last administration." But what is more relevant to the present situation is Mr. Wickersham's admission of "uncertainty as to the precise scope and meaning of the Sherman Anti-Trust law," his adverse reflection on its drastic quality and drastic legal interpretation and his hint of future amendment by Congress in the direction of moderation. Evidently the old "big stick" is reduced already in size and energy of swing. And such an utterance from the legal arsenal at Washington directs timely attention to some of the nebulosities of the Sherman Act as they are already disclosed by litigation.

For the most conspicuous example let us glance back at the Northern Securities case, now more than five years old, impressive, not to say startling, when the decision was rendered, but now well-nigh forgotten outside the courts. The decision on its face was sweeping. It held the stock control of the Great Northern and Northern Pacific railways by the Northern Securities Company a combination in restraint of trade and illegal; that the Anti-Trust Act applied to restraints of trade whether unreasonable or reasonable, actual or potential, to private as well as corporate combination, and it gave almost unlimited rein to the authority of Congress expressed by statute. The theory of high public values of free competition the court declared in the most explicit terms. But what may be called the judicial margin in the decision was thin. Four judges, Harlan, Brown, McKenna and Day, gave the radical opinion; Brewer gave them the majority of one, but only because he held the railway combination illegal, and he at the same time declared that the Sherman Act did not apply to minor and reasonable contracts in partial restraint of trade while freedom of investment remained the "inalienable" right of every citizen; and four judges, Chief Justice Fuller, White, Peckham and Holmes, dissented radically on the ground that the Anti-Trust Act does not apply to "ownership" of shares and they further criticise an interpretation of the Act which "would disintegrate society, so far as it could, into individual atoms" and "an attempt to reconsruct society." Such is the dissenting peroration of Justice Holmes, concurred in by three other judges, in a case which runs through 204 pages of the United States reports.

The narrow numerical majority in the decision is scarcely less noteworthy than the wide diverging in the legal view of fundamental principles as applied to the Anti-Trust Act; and since the decision was rendered five years ago a new judge has taken his seat upon the Supreme bench. In the later decision (November 7, 1908) of the United States Circuit judges, Lacombe, Coxe, Ward and Noyes, in the American Tobacco case one finds the same divergency in less degree. Three of the judges substantially follow the extreme opinion in the Northern Securities case. The American Tobacco Corporation is held radically to be a combination in restraint of trade and of benign competition and is doing an interstate business. But Judge Ward, dissenting, held that the tobacco company was, essentially, a state manufacturing corporation not an interstate trader, and had not, in fact, restrained trade, but the reverse. The earlier Knight sugar refining decision of the Supreme Court which bears upon the tobacco case is divergently interpreted by the Circuit Court justices; and, intermediately, there is only the Danbury Hat decision holding the boycott in restraint of trade. No wonder Attorney-General

Wickersham prenounces the Anti-Trust Act "uncertain" in scope and meaning.

The Act, in fact, is in its legal aspects vague nebulous and in a period of judicial transition. If unchanged and interpreted strictly by courts that hold to its letter and apply it sharply it can be made a weapon of severity, even of cruelty, and particularly so to the railway corporations whose interstate character is unquestioned. On the other hand, if developed conservatively it can be made in the end an agency of sane regulation with publicity as one of its incidental benefits. But this far the cases to which it has been applied have been limited in number and leave many phases of combination yet to be tried out. There is, for example, the "gentlemen's agreement" which has so often superseded the formal and incorporated trust or holding company. There is the holding company, itself, in manifold shapes. Finally there is the control based on an individual or group of individuals with a sympathetic relation to the original and underlying interest—as in the case of the Billard holding of the Boston & Maine. Can the courts in such a case go behind Judge Brewer's "inalienable" right of ownership? Can a state or the United States in such a holding of shares sue an emotion or issue an injunction against a sympathy? And, beyond all these, lie the uncertainties of future amendments of the Act by Congress—at which Attorney-General Wickersham points—which may modify or shift entirely by the tenor of earlier courts. The outlook, therefore, is hardly encouraging for that fixity and clarity which great vested interests crave in a national statute of such scope as the Anti-Trust Act. But it is only an extreme example of the judicial nebulosity sure to follow when a national statute falls upon interests at once varied and vast.

BALTIMORE & OHIO AND CINCINNATI, HAMILTON AND DAYTON.

For some time the directors of the Baltimore & Ohio have been considering the acquisition of control of the Cincinnati, Hamilton & Dayton, which is in the hands of Judson Harmon, as receiver. J. P. Morgan & Co. bought a controlling interest in the common stock of the Cincinnati, Hamilton & Dayton in 1905 for $160 a share and were to sell this controlling interest to the Erie, but when it was found necessary to put the road in the hands of a receiver, Morgan & Co. did not compel the Erie to take the stock, and still retain it.

While there has been no official announcement that the Baltimore & Ohio directors, the security holders' committees and J. P. Morgan & Co. have made any definite arrangements about the Cincinnati, Hamilton & Dayton, it seems pretty certain that some arrangement is about to be made by which the Baltimore & Ohio will guarantee interest on certain securities of the C., H. & D., and in return will receive an option on the $8,000,000 common stock held by J. P. Morgan & Co.

The advantages of such an arrangement to the Baltimore & Ohio are considerable. The B. & O. has its heaviest traffic district in the middle and is weak at the extremities. It has been likened to a balancing pole, heavy in the middle and light at both ends, and for this reason would find a collecting and distributing line west of Columbus, Ohio, of great value. It at one time tried to get the Hocking Valley, but was obliged to share that road with a number of partners. Similarly, the Philadelphia & Reading would have been of value to it, but the Vanderbilt lines were able to prevent this, and in 1882 a contract was entered into between the New York Central & Hudson River, the Fall Brook Coal Co. and the Philadelphia & Reading by which they were to favor each other in exchange of traffic and a through line was to be formed between Buffalo, N. Y., and Philadelphia, Pa. The contract was for 900 years.

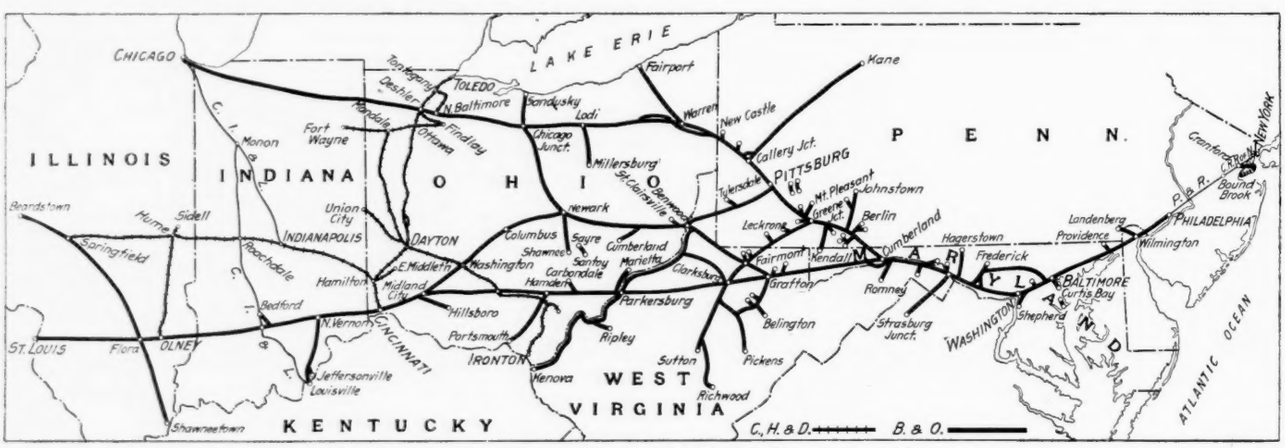
The Cincinnati, Hamilton & Dayton does an excellent originating and distributing traffic in the Central West in connection with the Queen & Crescent and the Pere Marquette. The C., H. & D. owns joint control with the Alabama Great Southern of the Southwestern Construction Co., which in turn controls the Cincinnati, New Orleans & Texas Pacific, leased from the city of Cincinnati. A through working combination between the Pere Marquette, the C., H. & D. and the Queen & Crescent, of which latter the Cincinnati, New Orleans & Texas Pacific is part, is of the greatest importance as an offset to the close relations existing between the Pennsylvania and the Louisville & Nashville. At present the C. H. & D. gives about one-fifth of its traffic to the Baltimore & Ohio, one-fifth to the Vanderbilt lines, about one-fifth to the Erie and the other two-fifths scattering. By control of this line the Baltimore & Ohio hopes to get the lion's share of this traffic.

The advantages of control by such a strong company as the Baltimore & Ohio to the C. H. & D. are rather a question of what terms the Baltimore & Ohio is going to demand for the use of its credit than one of absolute merit or demerit. The 4½ per cent. noteholders' committee have been the chief objectors to the plan proposed by the Baltimore & Ohio, but if, as seems highly probable, they have now secured terms that are satisfactory, the benefit to other security holders is apparently a very real one.

NEW PUBLICATIONS.

Railway Freight Rates, in relation to the industries and commerce of the United States. By Logan G. McPherson, lecturer on transportation, Johns Hopkins University, author of "The Working of Railroads." 441 pages; 5½ x 8½ in.; cloth. Henry Holt & Co.; New York, 1909. Price, $2.25.

Mr. McPherson has produced an exceedingly important book. It is not only the best existing account of the railway freight rate structure of the United States, but it is easily the best book on American railway traffic that has been written. There has been a singular lack of useful books on railway traffic in this country. The general nature and location of the freight moving industry in the United States was outlined 25 years



Cincinnati, Hamilton & Dayton and the Baltimore & Ohio Lines.

The Staten Island Rapid Transit shown by a broken line.

ago in Hadley's Railroad Transportation, and Charles Francis Adams, M. M. Kirkman and other of the older authors and economists have discussed some of the principal traffic problems out of which the rate wars of the seventies arose. But Mr. McPherson makes the freight traffic structure of the country his primary object; not a secondary one, and he has done an admirable piece of work.

The book discusses the principal kinds of traffic which move in this country as commodities, telling where they are produced, how they are made ready for market and where the market is. Then, broadening out into the transportation charge on these commodities, the regional rate structures are first discussed, from the historical point of view that is necessary to explain some of their apparent vagaries. For example, New England retains its manufacturing supremacy under certain very serious difficulties. Boston in particular is far removed from the sources of the raw materials which it works up, but it has an abundance of highly skilled labor. Consequently, the railways must so adjust freight rates into New England that the raw materials can move there in competition with other manufacturing points, and the manufactured articles can move out again and be distributed all over the country in spite of the obstacle created by the distance from Boston to western points. Freight rates in the trunk line and central traffic territory derive their present structure from the way in which the main stems of travel were pushed out towards the west in parallel lines and then branched out into a maze of complications. The trunk line percentage system was created in 1876 and the rate between Chicago and New York, whatever the distance might be, was designated as 100 per cent. Then the rate to or from certain principal intermediate points that were common to two or more railways was made a fixed percentage of the rate to or from Chicago. Thus the rate from New York to Pittsburgh became 60 per cent., to Cleveland 71 per cent., to Peoria, 110 per cent. of the New York-Chicago rate.

After the Interstate Commerce law was passed, however, in 1887, the changes in the rate fabric in this territory to avoid conflict with the long-and-short-haul clause worked havoc, so that a further revision of the percentage system was begun in 1892 and resulted in 1896 in the adjustment which, with a few changes, is in effect at present. Rates for east and west traffic are applied to groups of stations, each focused more or less directly upon a central basing point; but the rates as a whole bear only an indirect relation to distance, although the long-and-short-haul principle is rigidly observed on interstate traffic. In the trans-Mississippi and trans-Missouri territory, however, no device similar to the trunk line percentage system was applicable because of the absence of a definite basing line, like that resting upon a populous New York at one end and a populous Chicago at the other; hence the system of adjustment by fixed differences instead of percentage arose.

In the territory south of the Ohio and east of the Mississippi the rate structure has always been profoundly affected by the water competition of the Atlantic ocean and the gulf of Mexico. A large proportion of the manufactured articles used in this section comes from New York and the New England district, and when manufacturers in the central west want to compete for this business they have to get a rate to the east which can make a showing against the rates from the north fixed by the coastwise steamers.

The traffic conditions in Texas require a long and careful discussion by themselves and they are greatly complicated by the fact that the Texas Railroad Commission, ever since the days of Judge Reagan, has used the local freight rate system of that great empire, which is entirely under its control, as a protective tariff against all manufacturers outside of Texas. The Texas Railroad Commission is interested only in Texas industries and does not include the railways among these industries. Consequently, when the through lines coming down from the north have endeavored to reduce their interstate rates so as to make it possible for manufacturers in the central part of the country to get into Texas jobbing territory and compete with the manufacturers who ship by water to Galveston, the Texas commission has promptly reduced the local interstate rates to match, thus throwing the competitive situation just where it was before the first change, and making the only net result a general lower basis of local rates within the state. In consequence of this policy and of the policy of fostering a large number of small jobbing points in preference to a few strong ones, jobbing centers have arisen every 40 or 50 miles, but no one jobbing point has been enabled to attain the size and importance which it would otherwise have done.

After continuing the discussion of the regional rate structures throughout the country, the author takes up the commodity rate structures on which grain and grain products, live stock and dressed meats, cotton, lumber, etc., move. Then, having given the reader a clear idea of the outline of his work, he begins again with history and runs through the early tariffs and classifications; early rivalries and the beginning of through service and rate wars and tariff agreements. Mr. McPherson then discusses secondary freight services and developments of the freight service, such as the bill of lading, the theory and practice of demurrage, reconsignment, etc.

After a long and thorough discussion of the transportation charge in its relation to public policy, and of public sentiment as expressed in legislation, the author has a fascinating chapter, of quite unique importance, on the commerce of the cities, taking up under different general titles the freight traffic created by commercial districts, such as the north Atlantic seaboard, Buffalo, Pittsburgh, Cleveland, the Southeast, Cincinnati, Louisville, Chicago, Kansas City, St. Paul and Minneapolis, Denver, the Pacific coast, etc. This chapter alone is important enough to justify the book.

The book closes with a comparison of the railways with the agricultural and manufacturing industries—a chapter which reads more or less like a campaign document, but is nevertheless interesting. Not the least important thing which the author has done is the preparation of an excellent index, covering 35 pages of the book and enormously increasing its practical use.

We have little hesitation in expressing the opinion that Mr. McPherson's book will stand as the standard reference work on freight traffic and freight rates in the United States for a good many years, and from the standpoint of public policy we are exceedingly glad the book has been written. The country would be better governed and much less governed, if every legislator, state and national, had to pass an examination upon it before taking his oath of office!

Letters to the Editor.

THE USE OF MODERATELY SUPERHEATED STEAM.

Montreal, April 12, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

Referring to my letter in your issue of April 9, page 789, I find that one page was omitted by the man who copied the letter in my office. The last paragraph but one in the letter as printed should read as follows:

"Mr. Fry has quoted a steam economy on the saturated steam engine of 12.5 per cent. for the low superheat, and 30 per cent. for the high superheat engine, these figures based on pounds of steam per inch-horse-power. Taking British terminal units the consumption is 27,900, 24,800 and 22,000 per horse-power-hour, respectively, or as 100 is to 89 and 79. In other words, 40 deg. of superheat shows a thermal economy of 11 per cent. and 290 deg. of 21 per cent. Mr. Fry accounts for this extraordinary economy obtained with 40 deg. super-

heat by what is, so far as I am aware, a radically new theory of cylinder condensation, viz., that it is caused by the water carried into the cylinders by the steam. I am aware that the importance of cylinder condensation has within the last few years been questioned, but I have understood that there is little doubt of its really accounting for about the quantity of loss stated by Mr. Fry and that the usual explanation of it is correct. This explanation depends largely on the action of the cylinder walls, and while no doubt the wetness of the steam is a factor, considerable condensation certainly occurs with dry steam, and in fact it would appear inconceivable for one or two per cent. of moisture in the steam to condense 37½ per cent of it in the cylinders, while it has been carried along with the steam in the various passages without producing any such effect. The experiments with steam of varying degrees of superheat have shown a decrease in the cylinder condensation with each increase in the amount of superheat, and I do not know of any experiments with low superheat that have shown anything like the saving estimated. In those given in Ripper, the saving with 100 deg., 150 deg. and 250 deg. superheat was almost exactly in proportion to the amount of superheat, and according to this the thermal efficiencies of the engines under discussion would be as 100 to 97 and 79, or about a 3 per cent. saving for the engine with low superheat as against 21 per cent. for that with high, and these are, I believe, much more closely the figures that will be obtained in service.

H. H. VAUGHAN.

Contributed Papers.

BRITISH LOCOMOTIVE BUILDING.*

Trade has been quite satisfactory until about a year since, when it began to fall off. That is not chiefly due to foreign competition, although the Germans have taken orders for India which would otherwise have come here. The chief cause is bad trade—the absence of demand. The fluctuations in our trade are largely due to the changes in the locality of the demand. In the Atlas works, of which I was managing director before the amalgamation took place, 90 per cent. of the engines turned out in 1902 were for the home lines. In the following year 10 per cent. only were for the home lines. From the beginning of 1895 to the end of 1902 there was a very considerable increase in the volume of our trade. The demand for locomotives for the home lines and for the Colonies and India was very large during the whole of those years, with the result that the whole of our three works, which at that time were separate works, increased their output to meet the demand, but since the beginning of 1903 there has been and is a considerable falling off in the demand for locomotives. We have had some foreign competition in the United Kingdom, but only in exceptional times. In 1898 or 1899 orders were given to the United States in four or five cases, and one small order went to Belgium for engines for this country. This was shortly after the engineers' strike in 1897, when some of the locomotive shops were closed for five to seven months, during the whole of which time orders were being carried out very slowly and the railways were getting short of engines. British railways build nearly all their own engines now. They only buy from us when there is a sudden demand which they cannot fill themselves, and as they are not likely to alter that policy there is no chance of the home trade increasing. Railway companies attach great importance to possible improvements in locomotives. Some of them, particularly the London & North-Western and the North-Eastern, have spent very large sums in improving locomotives, successfully to some extent. In other cases we find that a certain engine, which has been thought a great deal of at the time it was produced, is gradually being superseded. On the North-Western the Webb compound engine, introduced about 1881, was considered to be a great advance on anything done before. These compound engines have been developed from time to time and increased in size, weight, etc., and now they are being superseded by simple engines of very ordinary construction. The great French engines, imported here for use on the Great Western, are very good engines for the class of work they have to do. They would not be much more costly to make in France as compared with a similar engine made at our works. The labor is not as efficient in France as it is here, but they work longer hours and get lower wages.

*From evidence of J. F. Robinson (a director of the North British Locomotive Co., Ltd.), before the British Tariff Commission.

EXPORT.

With regard to the colonies and foreign countries trade varies enormously. Many years ago we did a large trade with all Continental countries, but as they gradually began to manufacture their own locomotives we lost the trade. We still trade with Spain to some extent, and a little with Portugal, but the principal Continental countries we do not supply. now. France and Germany make their own locomotives, and Italy also to some extent. In Italy the German competition is very severe for any engines wanted.

Germany has not imported an engine from this country for many years. The duty there is over 30 per cent. Some years ago we sent some engines to Germany under special circumstances, but Germany is now a closed country to us altogether. If the Germans had to compete with us on all fours they would be squeezed out, but they get very good prices indeed for their own products in their own country owing to the ring or "kartell," and if they have not enough home orders to fill up their works to their complete capacity they compete with us abroad and take orders at prices which cannot pay. They dump in India, Egypt, Italy and the Argentine Republic. The position of the Germans is immensely strengthened by the fact that the railways belong to the state. The state by way of assisting the manufacturers does not encourage the railways to build their own engines, but prefers to keep the manufacturers going. Even if they had free trade the Germans would probably not allow engines to be bought outside.

With Japan we do a trade which varies considerably, depending largely on the severity of the competition by Germany—our great rival there. If they happen to be full of work we get the orders.

In the United States we have no opportunity at all. If the American makers had to make to our specifications they certainly could not compete with us, but if they may supply their own article, which is much cheaper than ours, and we have to work to a proper specification, of course we cannot compete with them. If we work on American lines and build a cheap article, in all probability they could beat us still, but if they work on our lines they cannot compete with us. The British locomotive is a much more complicated, much better designed and better built engine than the American. The American engine is a cheap article as regards materials, designs and workmanship. Our men, trained to a high point of excellence of work, cannot compete with men trained to do cheap work and do it quickly. Americans do not believe in our system of repairing by which we have engines running for 30 to 40 years.

In South America, British makers supply practically all the engines for the British companies, such as the Rosario, the Great Southern, etc. They use a good many engines, but it is a very fluctuating business.

British makers supply most of the engines in India, although a few are built in the railway shops in India. Recently they have given an order to Germany, which is quite a new departure. The Indian railways had been keeping their orders back, and came into the market with a rush and could not get their wants supplied here; they therefore gave orders first to the United States and afterwards to Germany. Germany got the orders for India because of the price and time

of delivery. At that time the locomotive shops in this country could not undertake delivery except over a very long period, and the result was that prices were high. The Germans had not much to do, they wanted work badly and were able to give early delivery and take orders at a lower price—at the same price we should get the orders in future, India would favor us to a certain extent. The government lines have never given any orders to Germany, it was only the guaranteed railway companies that did so. The first 40 engines ought to have been delivered in 1902, but were carried forward to the next year. They got some larger orders afterward. The first 40 engines were built in Hanover, and they had a great deal of trouble due to their being called on to produce a class of article and style of workmanship they were not accustomed to. When they submitted it to the inspector who had been inspecting our work he said theirs did not comply with the specification, and a large number of parts had to be scrapped. The later engines built by Germany for India were considerably improved because the builders found that otherwise they would not get the engines accepted. If they adopt a higher class of workmanship and pay larger wages they will find it more expensive to build the engines, but as long as the "kartell" goes on they will continue to compete with us in neutral markets, and successfull yin certain cases.

Railway companies in Canada have manufactured engines for themselves for many years past, and it is only when they are building for capital account that they buy outside; ordinary replacements are built in their own shops, but the Canadian Pacific and the Grand Trunk having very fine shops. In Canada they had works at Kingston, which led a precarious existence for many years and are now sold. They had some works in Montreal which were completed a few months ago, and have since been sold to the American Locomotice Company, so that the Americans have got a footing there and look forward to being able to supply the Canadian market from Montreal. Notwithstanding this, if the duty were taken off or reduced we might compete against the manufacturers there. Montreal is not an ideal place in which to build locomotives; it has a very severe climate in winter and a very hot climate in the summer, which is much against the output of the men. They must have a much larger area covered up than we have. Unless it is very wet indeed, a lot of our men work all the year in the open on certain jobs. If the duty in Canada against us disappeared altogether the Canadians would not compete. The labor party is not quite so strong in Canada as in Australia, but it is getting stronger every day. In February, 1903, we had two considerable orders in hand for the Canadian Pacific Railway, and they asked us about building 20 compound mixed engines (for heavy passenger or fast goods traffic), which had to be delivered out there in October, 1903. We were nearly full up with orders for the same company, the engine was a new engine to us, and we had no patterns and no drawings. They went to Germany, got an offer from the Saxony Company and placed the order for 20 engines with them. They came to us three months later, and asked us again to quote for 20 of the same engines to be delivered later on. We accepted the order, and our first engine was steamed on the day the first German engine was delivered in Montreal. Our last engine was delivered three months before their last engine. The order went to Germany on account of time, not price. They undertook a delivery they were not able to fulfill. The penalties in that contract are not settled yet. Experience in Canada will not encourage German trade there. Canada discriminates against Germany, and their manufactures pay over 33 per cent. more duty than ours.*

We supply engines to New South Wales and Western Australia. Victoria and South Australia build their own engines. In Queensland and New South Wales they sometimes build their engines. They pay a great deal more for what they make themselves. If the figures which are published in the Australian papers are correct, Australia is hopelessly out of competition with us in the locomotive building trade. It is not a question of scores, but hundreds of pounds.

There was a large demand in South Africa after the war and a great proportion of the orders came to our works. That is, of course, now decreasing, but as the country develops they will require many more engines. Cape Colony has bought a few engines from the United States, but since the conclusion of the war nearly all the Cape engines and all those for Natal, Orange Colony and Transvaal have been bought in this country. They have built no engines in South Africa.

RAW MATERIALS.

Our principal materials are steel, iron, copper and copper alloys. The copper and iron ores come from abroad, but we buy our supplies manufactured here. The iron and steel are cheaper in Germany, and probably also in the United States. In steel axles and tires, etc., the quality usually required here by locomotive engineers is very good and, therefore, expensive, and probably we pay far more for such articles here than if made in the United States or Germany. The class of steel imported from Germany is not used in our manufacture, but it has the effect of keeping the general price of steel down. A quality of plates similar to those manufactured by the people who make our boiler plates in this country comes from Germany. If they cannot get sufficient orders for cheap stuff because of such German competition they must compete for what orders they can get among themselves, and the result is that the price of steel plates, including boiler plates, is kept down by the competition in this country, which is accentuated by the German dumping. Dumping has not been of any other advantage to us.

TRANSPORTATION.

On much of our work, if being done for export, as we are close to the Clyde we do not pay heavy railway rates, but the rates for materials coming from Yorkshire where we get a large quantity of our steel and steel are high as compared with what they would be for a similar distance in other countries. In sending to Canada we have the sea passage to pay. That is a considerable amount. In the United States the locomotive firms are a considerable distance from the Canadian frontier, and get a long land carriage, which however is fairly cheap. The United States railways do not allow the engine to steam over the line, they haul it. When we deliver to English railways the engines are never allowed to be taken away in steam from the works. The companies refuse on the ground that an engine must not steam over their road unless they have inspected it. On Continental lines also such an engine is hauled by another engine as part of the train.

TECHNICAL EDUCATION.

Our fitters, turners and boiler-makers would not be improved by having technical or scientific training. The work in our places is so divided that the same man does the same job the whole year round, and by specializing in that way we get a better result than by having a good all-round man. There is not much new to learn about a locomotive. It has been going on since the days of George Stephenson. It has advanced in size and other respects, but it has got to about the end of its tether as regards improvement, and in our work as contractors there is not much scope for men of an inventive turn of mind. From my point of view as a locomotive contractor it would not help us very much to start such a thing as an engineering tripos at Cambridge or some similar institution in London; what you might do on railways is different. The design is usually supplied to us. If we get an order for a locomotive without any specfiications we should probably make use of some engineer's specification improved by ourselves according to our experience. If the engine were a new engine and had not been built before, we should take the

*At the time this evidence was given the British manufacturers of locomotives were receiving a preference from the Canadian Government of 33 per cent. of the duty charged on locomotives imported from other countries.

nearest thing we had to it, and work the parts in as far as we could, only making new parts where necessary. The United States railway engineers have become better educated in the line they have developed, as their engineers have certain ideas of their own which they insist on having carried out. As long as they were men of no education they were very much in the hands of the makers. Now the position has been to some extent altered.

TRUSTS.

In Germany in our business they have a combination which is recognized by the state railways, which tolerate this ring so long as they do not put their prices up abnormally. In the United States there was a large amalgamation in the locomotive trade, which included almost all the makers but Baldwins, the largest firm in the trade. The only amalgamation of any importance in the home locomotive trade was that of our own three companies, which took place in 1903, because it appeared to us that we could economize in production and expenses generally.

PROPORTIONS OF COST.

The proportions of the different elements of cost in our business vary very much according to the class of engines we are building and the specification we are working to. For productive wages we require 25 to 30 per cent. of the cost, materials 55 to 60 per cent., and fixed charges 15 to 20 per cent.

STANDARDIZATION.

British engineers have not made any advance in the direction of standardization. Each railway is a world of its own as far as making component parts of a similar pattern is concerned. It is practically impossible to make parts for stock, we never know what the next orders are going to be. We have tried standards for India to some extent, but the system will not have a very long life, the tendency being to improve the locomotives by making them more powerful and heavier. I am a member of the locomotive sub-committee of the Standards Committee, and at the time we started on this particular job we had certain regulations with regard to the weight, and especially the weight per axle admissible on the broad-gage and metre-gage lines. Before we got through with our standards these figures had been altered on certain lines and our standardization was thrown into the basket again to a large extent. Even when the Standard Committee engine was adopted on certain lines in India there were certain excrescences that had to be added to it to please the various locomotive superintendents. We tender for engines frequently according to the specification of the engineer. The Baldwin Locomotive Works used only to make engines to their own specification, but they have been forced into abandoning that to some extent. The Indian specifications to which we work are extremely rigid, but some orders were given to American builders without specifications being particularly insisted on as regards design or material. The conditions were unusual, but they wanted engines in a tremendous hurry and they had to get what they could. British manufacturers suffer in having to follow specifications of the various engineers if the other makers competing with them are not obliged to comply with those conditions. The engineers employed by the American railway companies have been generally inferior to those here, because the manufacture of locomotive engines for a great number of years was not undertaken by the railway companies. Their engines were bought to the maker's specifications and to the maker's drawings, so that they did not require trained men for designing engines . A certain number of men who got into the position of locomotive superintendents developed ideas of their own, and as railways grew in importance and wealth they would not any longer be content with buying the engines as made by Baldwin or Schenectady or other makers. The first railway company to make the change was the Pennsylvania, who have works of their own at Altoona, and therefore they were able not only to design their engines but build them, and if they ordered engines, unless they were in a great hurry, they used to insist on having their own specifications and drawings complied with by other makers. Other railways have since followed the Pennsylvania.

DUTIES.

The adoption of an Empire tariff here might assist us in our production generally, but a tariff applying exclusively to Great Britain would not alter the condition of things very much. An Imperial tariff would block out to some extent the bounty-fed competitions of Germany and the United States. The obstructive effect of foreign tariffs is that we are excluded practically from all Continental countries where engines are built, and from the United States. We are excluded from Germany, Russia and France except under special circumstances. Whether this country had a protective tariff or not the tariff policy of other countries would have tended to the success of our competitors. If the Germans had not this country and its colonies and dependencies in which to dump their surplus products they would have thought twice about developing their industries to the extent they have done. Securing the home markets at a high price enables our competitors to compete at or below cost in a neutral market, and so keep the works going and make their profits out of the home orders. The tariffs of Germany and the United States enable them to get orders in their own countries at high prices. It is better to dispose of 75 per cent. of your output at high prices and the remaining 25 per cent. at any price that gives you more than the cost of materials and wages, than have your works going three-quarter time.

PREFERENCE.

Through the preferential tariff in Canada we got some orders in 1902-3 for the Canadian Pacific. All the orders previous to that for many years had been given to the United States. The duty is 35 per cent. generally, and we get a preference of one-third. The price of our locomotive in Canada is £3,000, including the duty, which would be £1,000 to a United States maker, giving an advantage of over £300 in favor of the British manufacturer against the foreigner, or about 12½ per cent. on the price of the locomotive without the duty. A preferential tariff given to the British manufacturers of locomotives throughout the whole of the empire would be an advantage to the British manufacturer of locomotives. A preferential tariff sufficient to give us an effective preference in the colonies, *i. e.*, enough to compete with their own manufacturers as well as outsiders, would help us a good deal. In New South Wales there is a strong, well-organized labor party, who practically hold the control of the policy of the government. They have got wages up to very high rates, and they are determined to develop all the manufactures they can in their own country irrespective of whether the thing can be produced outside and sold to them cheaper than they can make it. A preference to the colonies for the supply of whatever they produce is of no use to us as long as they take our preference but refuse to buy our locomotives. Presuming an imperial preference could be arranged suitable to all the countries concerned, the natural tendency would be to develop trade in the British Isles by taking the trade that at present goes to Germany and the United States. The more we produce the cheaper we can produce it, and the more we enlarge the area of our markets the more regular the supply of orders tends to become. If we could enlarge the area to include Canada and the whole of Australia as well as India we should have a much better chance of having a regular flow of trade. It would also very much benefit the workman, for he suffers like ourselves. In certain years he has more work than is good for him; he works overtime nearly every night, and the next few years he cannot get full employment. This tends to drive up wages and increase the cost of production, whereas if we had a regular flow by having this market to ourselves, wages would become regular and the workmen would be better off.

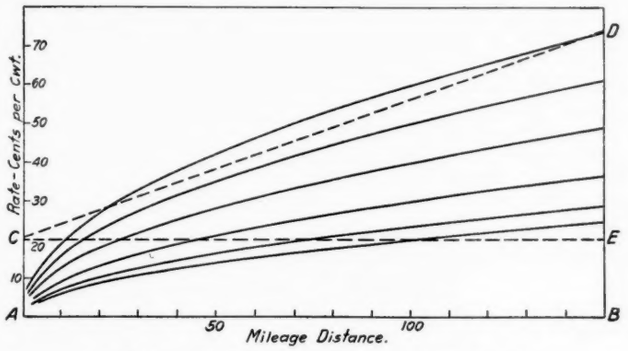
RAILWAY RATE MAKING IN PRACTICE.

BY WILLIAM Z. RIPLEY,
Professor of Economics, Harvard University.

I.

THE EVOLUTION OF A RATE SHEET.

The task of constructing a freight or passenger tariff is an eminently practical one. The process must be tentative and experimental. Little can be calculated in advance. Tariffs are not made out of hand; they grow. Not until a rate has been put into effect, can its results be known. The lower limit of charges, however, is more or less fixed. Obviously the rate must not be less than that portion of the variable expenses, incident to each particular item of business. This variable expense is divisible into two parts, one for loading and unloading and the other for actual movement. The first step in constructing a tariff, therefore, is to separate these two portions of the variable outgo. General experience fixes the terminal outlay for loading and unloading at an average figure of about twenty or twenty-five cents per ton at each end of the line; that is to say at an average of about two and one-half cents per hundred pounds as the total terminal cost.* Just where, above or below this average, the figure for any particular tariff will lie, depends upon a multitude of details. This terminal expense is obviously quite independent of the length of the haul. It costs no more to load for a carriage of 3,000 miles than for one between two adjoining stations. It is the second portion of the specific costs, namely the movement expense, which varies with the distance. This movement cost is more difficult of determination, as affected by a multitude of variable factors, such as the grades, curvature, number of stops, the size of train load, and above all the volume of the traffic. Assuming the simplest physical conditions, one would expect the movement expense, aside from the initial cost of getting up steam in order to move at all, to rise proportionately to the distance traversed. Graphically represented the tariff would appear somewhat as follows:



Relation of Cost of Carriage to Distance.

In this diagram the distances of carriage are represented along the horizontal line, A B; while the rate charged is laid off vertically. The lines A C and E B represent the constant terminal cost; while the steadily rising rates with increasing distance, due to movement expenses, are shown by the sloping dotted line C D. This chart at once demonstrates why under the very simplest physical conditions a straight mileage tariff is unscientific and unreasonable. For the constant terminal expense spread evenly over the mileage traversed, as the movement expenses grow, becomes progressively less and less in proportion to the total of the two, which constitutes the real rate. The longer the haul, the lower the ton-mile cost as a matter of necessity. As Chanute calculated on the New York Central a generation ago,† while the average cost per mile of hauling a ton ten miles was 4.062 cents, it descended progressively to less than one cent per mile for distances over five hundred miles. A common rule is that the rate rises as the square root of the distance, rather than in proportion to it. A hundred-mile haul represents a cost approximately only twice as great as one of twenty-five miles, instead of being four times as much. For thrice a given cost the haul may be increased nine times. The course of such a tariff with increasing distance would be represented by the parabolic curved lines on the preceeding diagram.* The particular curve would depend upon the commodity and local physical conditions. In territory where movement expenses were heavy or operation difficult the curve would obviously rise more rapidly. Such a mathematical tariff does not depart widely from the one traced by the heavy dotted line C D first described. The progressive decline of the per mile rate with increasing distance may be illustrated by the rough estimate of allowing two and one-half cents per hundred weight or fifty cents per ton for terminal cost, with one-half cent additional per mile for movement expenses. For a ten-mile haul this would cost fifty-five cents, or an average of 5.5 cents per mile. Were the distance 500 miles the average cost would be only $\frac{50+250}{500}$ cents or 0.6 cents per ton mile.

Thus far the problem has been seemingly simple. The next step introduces new complications. Our hypothetical railway line at a point one hundred miles out, may cross a navigable river or canal, or may intersect another railway. Engineering considerations of absolute cost of operation now no longer predominate. Relative costs by rival lines enter into the case. Water lines or more direct railways compete for the traffic. One cannot even fall back upon the cost of carriage by any of these lines, either the weaker or the stronger. An entirely new principle comes into play. The alternative is presented of taking the business at a rate lower than, and out of line with rates on general traffic, rather than to lose it to another line. At first sight it would appear that it were better to abandon the traffic than to take it for less than a fair average return or profit. This is a serious matter. The tonnage offered is large. The existence of active competition for it, is proof of its importance. Railways meet at large towns, and large towns become larger because the roads meet there. The main reason for not abandoning the traffic, however, arises from that primary fact, to which one constantly recurs, that all expenses are not alike in their nature. A concrete example will make this plain.

Suppose, for instance, the normal rate to yield a fair average return, all expenses considered, be thirty cents per hundredweight. Two-thirds of the cost of this, or twenty cents, would not cease as outgo, were this business abandoned. The rails would rust, the ties would rot, the trains would move, but with

*Testimony before the Hepburn Committee, in 1879, p. 2921, is interesting on this point.
†U. S. Reports on Internal Commerce, 1876, p. 25.

*U. S. Industrial Commission, 1900, IX, p. 631. *cf.* also diagram of European tariffs in Elkins Committee, U. S. Senate, hearings etc., V, Appendix, p. 271.

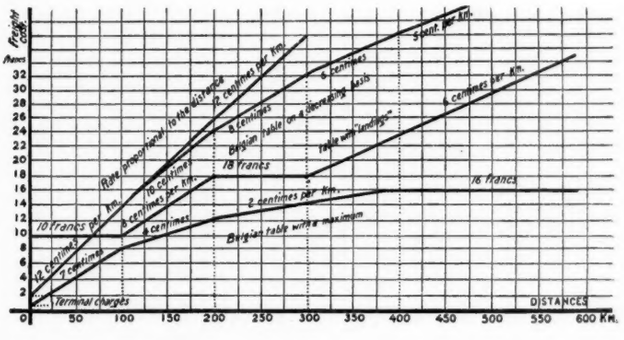
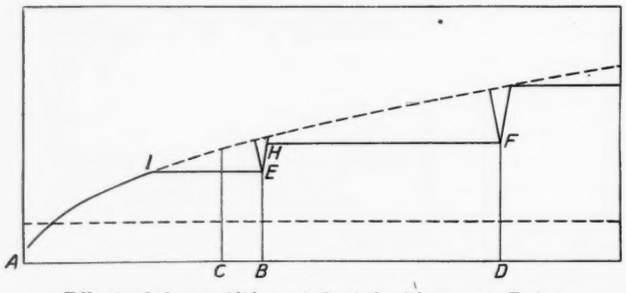


Diagram of Belgian Tariff Sheets.

lighter loads, and the fixed charges would still go on inexorably night and day. Ten cents per hundredweight will meet the variable and extra cost incident to this particular business. A fifteen-cent rate would at least recoup these outlays. It would do more. It would contribute five cents per hundred pounds to the twenty cents outgo per hundredweight, which, without the traffic, would have to be borne *in toto*. Even a rate of eleven cents would contribute something to this end. For it would leave a surplus of one cent per hundredweight to lighten the other burden. Adopting Hadley's phraseology, if you take at eleven cents, freight that costs you thirty cents to handle, you lose nineteen cents on every hundredweight. If you refuse to take it at that rate, you lose twenty cents on every hundredweight you do *not* carry. For your constant expenses go on, while the other road gets the business. There is only one course open. The rate at the competitive point must be cut, if not to make a profit, at least to stop a greater loss. And one comfort may be uncovered in so doing. The lowered rate may so stimulate new business and enlarge the volume of traffic, that it may be handled at much lower cost. In fact this consideration alone in absence of all competition, may induce a lowering of rates at certain points out of line with the general schedule. This incentive conditioned by the fact of increasing returns, is always in the background. The destiny of many places is manifested in terms beyond the control of the carrier. Soil may be poor, climate or population adverse to progress. But some particular places enjoy peculiar advantages for growth. Not to stimulate new business at these points where traffic might be cultivated, even without rivals in the field, is little better than allowing it to escape over a competitor's line of rails, were they present.

Cutting the normal rate at competitive points or at important points in order to stimulate traffic, in conformity with the principle above stated, transforms our tariff diagram as shown herewith. The rate rises steadily with the increasing



Effect of Competition at Certain Places on Rates.

distance from A, except at E and F. At these points it is fixed at a lower point, determined not primarily by the cost of service at all, but by the available demand for it. Traffic at these points is charged what it will bear; not as much but as little as it will bear: which being translated means that the charge is set as high as possible, still holding the volume of business constant, or even increasing it if that can be accomplished. The total profit is constituted of the profit per unit of freight multiplied into its volume. The center of interest is here shifted from the average profit per unit considered alone, to the total profit thus obtained. At this point another difficulty presents itself. Although as set forth elsewhere, local discrimination,—charging a lower rate for a more distant point,—may sometimes not only be not injurious but actually beneficial to all parties concerned, it is the exception, not the rule.* Ordinarily to accord a remote point a lower rate without patent cause, is an economic anomaly, and, moreover, a political blunder. It violates the democratic principle of cost of service as underlying rate schedules. Most legislative bodies have prohibited it by law. The United States and most of the American commonwealths do not permit it, other than in exceptional cases. The result is that on our hypothetical tariff, the rates from A to points intermediate between A and B and B and D must be cut to the level prescribed for those latter named places. Such was the action taken by the trunk lines in 1887 in conformity with the requirements of the long and short haul clause of the federal Act to Regulate Commerce. An original progressively rising tariff is thus at once transformed to a series of level grades or platforms, the shifts of level corresponding to the location of large towns or competitive centers; and the grade of each platform being fixed by the rate determined under competition at those points.* This ascending series of grades may be most irregular, as conditioned by local circumstances. The general steepness of the gradation is low on eastern roads like the New York Central, with a large volume of traffic and easy operating conditions. On western lines like the Denver and Rio Grande, in rugged territory, with a sparce population and light tonnage, the per mile rate rises rapidly and the gradation of the general tariff is steep. But always it will be found that the changes in rates occur at competitive points, with transition in a new level of rates determined by the conditions at the next competitive point beyond.

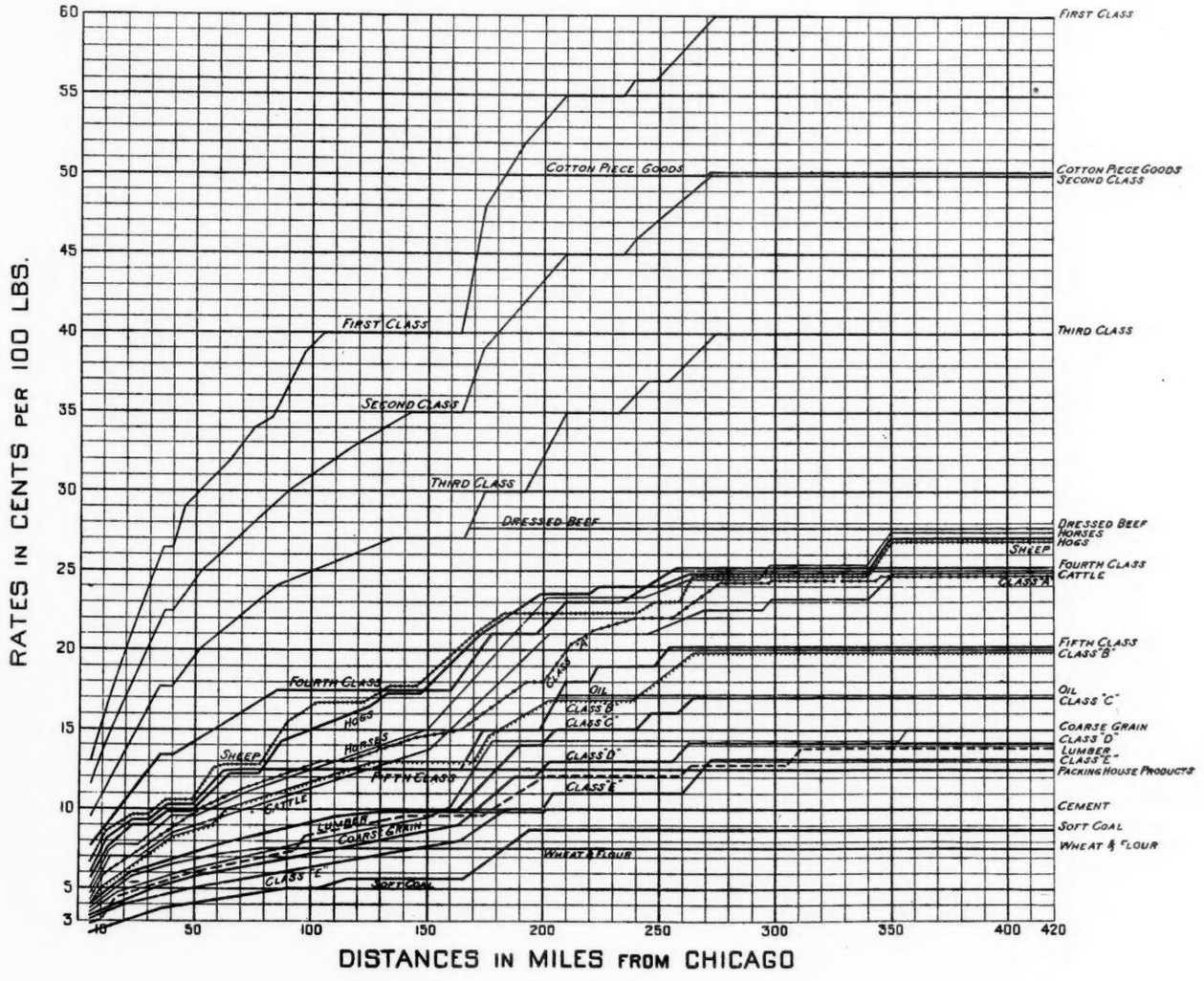
One important fact concerning this tariff thus far developed, is that of course the height of the upper level at the most remote point must never exceed what the particular traffic will bear. In other words, supposing that the traffic consist of grain or coal, not more than a certain amount could ever be charged, no matter how great the distance, without so far diminishing the profit in the transaction as to render the business impossible. This is shown by the diagram on the opposite page, whereon it appears that each commodity, coal, wheat, cement, lumber or oil, having attained a certain level of rates, never rises thereafter, no matter what the distance. Each attains the maximum of what it will bear. That level it can never exceed. This immediately leads to another consideration. No single tariff is applicable to any large number of commodities. Each one must be regarded as a law unto itself. Not only does the ultimate amount which each is able to bear depend upon the value of that commodity, but also the conditions determining competition with respect to it must be different all along the line.

Thus it appears that the height of the extreme upper level in our diagramatic series of rates is fixed by the highest charge which that particular traffic will bear. Beyond a certain point, no matter how great the distance, the rate cannot be increased above this level. This maximum varies, of course, with each commodity. On cotton it may be 55 cents per 100 lbs.; on grain or coal it will be much lower, and on sand or cement lower still. The problem of the traffic manager is to attain this highest rate as speedily as possible with increasing distance, and to grade his rates with distance up to this level as quickly as possible, consistent, of course, with maintenance of a full volume of business. But not only may the final limit of what the traffic will bear be different for each commodity; the steps or stages by which the rate progresses up to this maximum are quite independently determined. The actual tariffs of local class rates in general are much simpler than the commercial conditions of rate making often warrant. Probably the major portion of tonnage on American railways moves under special or commodity rates. Even in Prussia over three-fifths of the traffic is of this exceptional sort. These special rates are made with a view to particular circumstances prevalent at the time. Bids from a quarryman in Vermont on stone for a public building in Chicago, may be dependent upon the grant of a low rate on his marble in competition with a quarry in North Carolina also able to supply the particular stone required. The various ascending series of rates are thus rendered bewilderingly complex. This is shown by the accom-

*This topic of local discrimination is exhaustively treated by the author in the *Quarterly Journal of Economics*, May, 1909.

*Such a tariff on the Illinois Central is charted in Reports, U. S. Industrial Commission, IX, p. 295.

panying diagram of rates between St. Paul and Chicago.* The rate on a cheap, heavy commodity like coal probably rises rapidly at first, and soon attains a maximum beyond which it can never go. On this diagram, for instance, the freight rate on soft coal for points up to 180 miles out is higher than that on flour. Beyond that point the flour rate in turn exceeds that on coal. Cement is higher than lumber for the first 150 miles; but after that point the relatively greater value of lumber holds it steadily above cement. On heavy cheap commodities the relatively high cost of cartage in competition enables the railway to reap the full measure of its advantage and to charge well up to the maximum of what the traffic will bear, within a comfortably short distance. Moreover, the ment of some particular industry, wherever it crosses our hypothetical line, effectively holds down the rate on the product of that business. Junction points with other railways having no such interest may have no influence upon that rate, but may cause modifications in other directions. Another railway being in need of back loads, as a result of a predominant movement, let us say, of beef cattle at certain seasons of the year over its line, may introduce competition in all the tonnage capable of being carried on cattle cars. Such a road holds down the rates on this traffic wherever it happens to cross, but has no effect upon any other rate. Thus it comes about in practice, as the last diagram well illustrates, that the tariff lines cross and recross one another, generally rising with



Class and Commodity Rates Between St. Paul and Chicago.

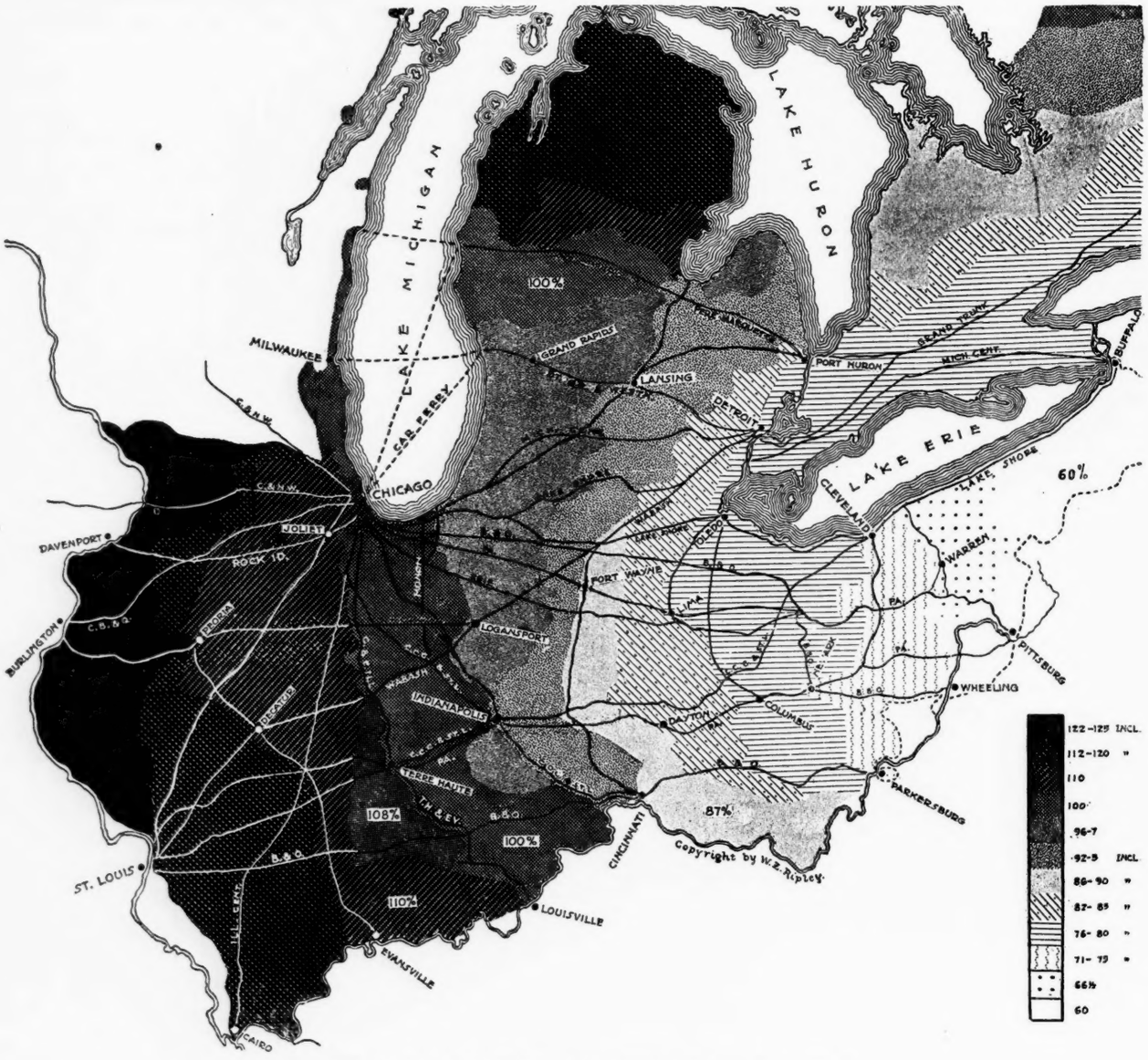
variable costs for terminal charges have to be considered. Wherever they are high the rate must rise at once sufficiently to cover these, no matter how short the distance; but thereafter the rate may not need to be increased greatly for some time. On light higher-grade goods the wagon is an effective competitor for longer distances. Moreover, the competitve points at which rates rise from stage to stage are seldom the same for all classes of goods. A river crossing brings competition for coal, lime or cement, but does not affect the rates chargeable on high-class freight which seldom goes by water in any event. A railway specially interested in the development of some particular industry, wherever it crosses our hypothetical line, effectively holds down the rate on the product of that business. Junction points with other railways having no such interest may have no influence upon that rate, but may cause modifications in other directions. Another railway being in need of back loads, as a result of a predominant movement, let us say, of beef cattle at certain seasons of the year over its line, may introduce competition in all the tonnage capable of being carried on cattle cars. Such a road holds down the rates on this traffic wherever it happens to cross, but has no effect upon any other rate. Thus it comes about in practice, as the last diagram well illustrates, that the tariff lines cross and recross one another, generally rising with increasing distance, but at all sorts of different times and places.

Few generalizations are possible in this connection. Rate making must in a growing country ever be a matter of infinite detail. It is generally true, however, that beyond a certain point the tariff on different grades of commodities will separate more and more widely with increasing distance. For obviously after the low-grade goods have reached the maximum which they can bear—and this they tend to do speedily—they must remain practically constant; while those of higher grade continue progressively rising. And for very short distances the rate on the low-grade goods may even exceed that imposed upon higher-class tonnage. The coal rate for a ten-mile haul may exceed that upon some commodity worth twice as much;

*From Stickney's Railroad Problems, p. 69.

but for a 200-mile haul the coal rate may be only one-eighth of the rate on the other goods. Long experience on the part of the carriers has, however, enabled them to arrange their tonnage in classes; for each of which the conditions are more or less uniform. By reserving the exceptional traffic for special treatment under commodity rates, a fairly consistent scheme of rates rising by stages with increasing distance may be evolved.

Few standard railway tariffs in the United States develop beyond the point covered by the preceding paragraph. Many of them are unable even to reach this stage of logical growth. In the South, for instance, they have never got beyond the stage of progressively rising local rates, with independent and often radically reduced charges at all large towns or competitive points. Each traffic manager, particularly since the effective prohibition of working agreements between competing lines by the Trans-Missouri Freight Association decision of the Supreme Court in 1896, has been left to work out his own salvation, not aided by, but in spite of, the efforts of his rivals. There is, however, one example of such further development in the so-called Trunk Line territory, lying east of the Mississippi and north of the Ohio and Potomac rivers. Conditions here, in general, are most favorable by comparison with the West and South. Both population and traffic are dense, and the state legislatures are conservative in making grants for the construction of new lines. The companies are historically mature. The good fruits of co-operation had already appeared in the evolution of a scientific and logical scheme, long before such co-operative action had been frowned upon by the law and the courts. All the railways in Trunk Line territory have worked in harmony, so far as general classified local tariffs are concerned—however much they may have fought one another over differentials to seaboard cities,



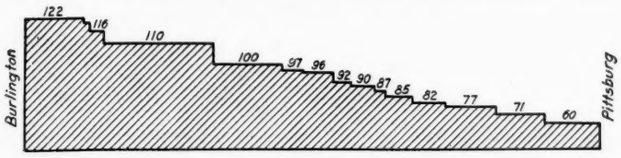
Percentages of New York-Chicago Rates. East Bound.

or export and import rates. Their system is comparatively simple in principle, although it has required the experience of many years to work out in detail. Fully described elsewhere,* it will suffice for present purposes to say that all rates from intermediate points between Chicago and New York, are fixed at a definite proportion of the Chicago-New York rate both for east and westbound shipments. Thus, for instance, as shown by the appended map of trunk line rate distribution, the rate from Detroit to New York is 72 per cent. of the Chicago-New York rate. The percentages from the

*Ripley, Railway Problems, pp. 309-332.

following points are as indicated, namely: Cincinnati, 87 per cent; Indianapolis, 93 per cent.; Grand Rapids, 96 per cent.; Peoria, Ill., 110 per cent.; Louisville, Ky., 100 per cent.; Milwaukee, 100 per cent.; and even points in Canada, such as Toronto, 78 per cent., etc. Every place, no matter how small, has a special percentage of the New York-Chicago rate assigned to it. This rate varies with any variation of the Chicago-New York rate. Thus when the Chicago-New York rate, first-class, is 75 cents, the rate from Indianapolis is 93 per cent. of that figure. Any change of Chicago-New York first-class rates changes every intermediate rate in exactly the same proportion. This was well exemplified in the rate wars of 1893. These percentages have been fixed after a long process of compromise among conflicting interests. Another point of special interest is that these rates are adjusted on the basis strictly of the long-and-short-haul principle, namely, that all intermediate points enjoy a somewhat lower rate than the terminal points, although the percentage may not be exactly upon a mileage basis. Consideration of the distribution of these percentages points to many apparent inequalities in the adjustment; but as a matter of fact it will be found that the existence of competing routes, of water transportation, or of other factors, offers a partial explanation in most instances.

Such being the general character of this comprehensive Trunk Line system, the relation of it to the tariffs described heretofore is not difficult to demonstrate. Each separate railway having developed a well-ordered rate schedule, they have all met and agreed upon a unified scheme; which as far as possible harmonizes all conflicting interests. The gradation of rates rising with increasing distance from New York on each separate road, is adjusted to the corresponding grada-



Cross-Section from Burlington, Iowa, to Pittsburg.
Figures show percentages of the New York-Chicago rate.

tion of rates of its neighbors on either side. The result is a series of rate zones,* lying more or less concentrically about the terminal point. These zones are highly irregular in width and area, but possess one feature in common. Each remoter zone is one stage higher in rates than its predecessor. This relationship is indicated by the cross section diagram herewith. This cross section, of course, differs from the diagrams heretofore shown. It is purely geographical, being taken, not along one single railway, but as the crow flies —straight across the whole Trunk Line territory. But one should, in order to appreciate the significance of this elaborate scheme, imagine a whole series of such progressively rising rates, radiating out along the line of each railway. Connecting the corresponding levels or stages upon each one with those of its neighbors, the concentric zones are immediately outlined. The advantage of such a broad scheme is that it generalizes the single line tariff; taking into view every place, no matter how small, and irrespective of its location whether upon a thorough line or merely a local transverse one. Every town, no matter how insignificant, is assigned a place in a logically evolved plan. Such would seem to be the ideal of rate construction, toward which all traffic managers should strive.

(To be continued.)

The Spanish railways had considerably larger earnings in 1908 than in 1907, thus forming an exception to the general rule.

*Ripley, Railway Problems, p. 318.

TRAFFIC STUDIES.

BY RAY MORRIS,
Managing Editor of the *Railroad Age Gazette.*

I.

OREGON RAILROAD & NAVIGATION COMPANY.

The rail operations of the Harriman roads in the Pacific states extend from Seattle and Spokane, Wash., on the north, to the Mexican border, on the south, and then, bending through Arizona, the lines continue down the east shore of the gulf of California far into Mexico. For purposes of traffic consideration, operations in this enormous territory may be classified under three main heads: local operations on the Pacific coast; operations, both through and local, over the northern part of the system and the Union Pacific, and operations over the central and southern part of the system and the Southern Pacific.

Operations over the northern lines must again be divided into four parts, of which one embraces the movement between Portland, Ore., and San Francisco; another the movement between San Francisco and Ogden, Utah; another the Oregon Short Line, and another the Oregon Railroad & Navigation Company. All four of these main classifications in the northern part of the Harriman territory west of the continental divide have certain common characteristics. They have extremely heavy westbound traffic moving towards the coast cities, and extremely heavy eastbound traffic which is routed over the Union Pacific east from Ogden, Utah, and Granger, Wyo., so far as it is possible to do so.

This group of lines does not quite form a square, but it comes somewhere near it, with the Oregon Railroad & Navigation Company forming the north side, the Oregon Short Line the east side, the Central Pacific and its extensions the south side, and the Shasta route of the Southern Pacific the west side. The territory inside this route square consists of most of Oregon, most of Idaho, the northern part of Nevada and the northern part of California, with a corner of Utah, a corner of Washington, a corner of Montana and a corner of Wyoming. Its most marked characteristic from the standpoint of railway traffic is that it contains vast quantities of raw materials which move both ways, and that it is served by comparatively little other railway mileage than that of the Harriman lines.

The northern boundary of this enclosed area is supplied by the Oregon Railroad & Navigation Company, which extends from Portland, Ore., east along the south bank of the Columbia river and along the Lewis fork of the Columbia river to Riparia, Wash., where it leaves the river and branches off for Spokane, Wash., Wallace, Idaho, and Grangeville, Idaho, reaching Grangeville by way of Lewiston over certain jointly owned properties. From Umatilla, Ore., not far west of the point where the Columbia river makes its great bend from the north, a branch runs off southwest to Huntington, Ore., on the Snake river, where junction is made with the Oregon Short Line. Besides these main features of geographic location, the Oregon Railroad & Navigation Company also sends numerous feeders out into timber and into agricultural, grazing and mining districts. Until the building of the railway down the north bank of the Columbia river from Pasco to Portland as a joint enterprise of the Great Northern and the Northern Pacific, the Oregon Railroad & Navigation Company was the only direct route from the Portland gateway to the Spokane gateway; it is still the only direct line from the Portland and Spokane districts to points on the Union Pacific main line, via the Oregon Short Line. The Oregon Railroad & Navigation Company also operates 258 miles of steamer lines, of which 78 miles are on the Snake river between Riparia, Wash., and Lewiston, Idaho; 45 miles are between Portland and Dayton, Ore., on the Willamette; 20 miles are on the Columbia river, extending from Astoria, Ore., to the sea, and 115

miles are on the Columbia river and the Pacific ocean, extending between Portland, Ore., and Ilwaco, Wash.

HISTORY.

The Oregon Railroad & Navigation Company was chartered July 16, 1896, under the laws of Oregon, as successor to the Oregon Railway & Navigation Company, which became insolvent in 1893. The Oregon Railway & Navigation Company was chartered in 1879 as a consolidation of the Oregon Steamship Company, the Oregon Steam Navigation Company and the companies owning the railways around the rapids of the Columbia river. It was leased for 99 years from January 1, 1887, to the Oregon Short Line, and the lease was transferred to its successor, the Oregon Short Line & Utah Northern Railway, in 1889. The rental of the company prior to 1893 was guaranteed by the Union Pacific; at the present time the Oregon Railroad & Navigation Company is controlled by the Union Pacific through ownership of almost all its capital stock. The Oregon Railroad & Navigation Company now operates 1,340 miles of line, of which 678 miles is known as the Oregon division and 662 miles as the Washington division.

TRAFFIC.

Of the total freight tonnage of the Oregon Railroad & Navigation Company about 26 per cent. consists of products of mines, and some 20 per cent. of this is ores from the Coeur d'Alene district, in the northwest corner of Idaho. These ores move over the Oregon Railroad & Navigation lines west into Washington through Riparia and Walla Walla, Wash., and Pendleton, Ore., and then southwest to Huntington, Ore., for haul over the Oregon Short Line. They have also a good movement over the entire Oregon Railroad & Navigation upper main line from the Coeur d'Alene district to the Vallejo smelter at Portland, and part of them move north to Spokane for transit to Tacoma and Everett over the Northern Pacific. The Northern Pacific will also have its own through routing for this ore over its new cut-off from St. Regis to Paradise, Mont., but the haul via the O. R. & N. line is 150 miles shorter for points on Puget sound. These Coeur d'Alene ores are silver and lead only, and the principal tonnage goes to Colorado to be smelted at Denver, Pueblo, Leadville and Salida. About 80 per cent. of all the Oregon Railroad & Navigation ore tonnage moves through Huntington.

Timber is the second largest haul on the O. R. & N., and amounts to about 25 per cent. of the total traffic. A large part of this originates on connecting lines, particularly the Southern Pacific lines in Oregon, running south, west and northwest from Portland.

The next largest tonnage movement is grain, aggregating about 19 per cent. of the total. This is largely wheat, with a good movement of barley and of oats, and with practically no corn. The normal grain movement is west to the coast, and almost all the Oregon Railroad & Navigation lines share in this traffic, except those in the mountains. The barley all comes from Garfield and Columbia counties in Washington.

This grain is largely exported from Portland. Within the last three or four years export of whole grain to China from Portland has become quite a factor. The grain that does not go to China moves to California and to Europe. California used to export a hundred ship loads or two of grain every year, but now does not raise enough for its own needs. Shipments to California of wheat from Washington and Oregon amounted last year to 3,750,000 bushels; about 450,000 barrels of flour also went to California by boat from Puget sound and Portland. The greater part of this is milled in transit at interior points, the principal milling points being Spokane, Walla Walla, Waitsburg, Dayton and Prescott, Wash., and The Dalles, Pendleton, Athena, Milton, LaGrande, Union, Imbler, Alicel and Portland, Ore. Portland is very much the most important milling point, and turns out some 4,000 barrels per day from the Portland flouring mills, which are the pioneers of the export flour trade to China and Japan.

Of the wheat exported to China and Japan last year from the Columbia river, Hongkong took 730,000 bushels, Yokohama 370,000 and Kobe 80,000. The total wheat shipments from Portland amounted to 16,481,548 bushels in 1908, of which more than 90 per cent. was moved by the Oregon Railroad & Navigation. The wheat exports from the Columbia river were 13,039,956 bushels, of which the United Kingdom took about 7,155,000.

The flour shipments from the Columbia river are also very heavy, amounting to well over 1½ million barrels in 1907, and to not quite a million in 1908. Almost all this flour is brought to tidewater by the Oregon Railroad & Navigation Company.

The average flour haul of the O. R. & N. is probably around 200 miles; the average wheat haul, 300 miles, and the average ore haul, 325 miles, excluding in this computation crude ore, which is hauled from the mines to the concentrators at Wallace, Idaho. The haul on this crude ore averages less than ten miles, but the O. R. & N. gets it later for further carriage. The ore is concentrated in a ratio of about eight to one.

The rate to Denver and Pueblo is $8 per ton for concentrates which do not exceed $60 in value, and this is the rate on which the bulk of the silver and lead ore moves. The distance is from 1,500 to 1,600 miles. The ore that goes to New England only pays $12 per ton, which reduces the average rate to below half a cent per ton per mile.

On the O. R. & N. timber movement is east through Huntington, and the great bulk of this timber is hauled fairly long distances, some of it going to New England. There is very little log movement on the line, most of the timber being handled sawn. The rate varies from 30 cents into Idaho to 75 cents to the Atlantic seaboard, and the average lumber earnings to the O. R. & N. are perhaps $50 a car.

Wheat is the most profitable traffic on the line. It takes a local rate because it moves west, whereas if it moved east it would be no more profitable than lumber. When grain is high in the East there is occasionally a considerable movement to eastern points, and at a rate only a trifle higher than the lumber rate. The grain rate to Chicago is 57½ cents, or $11.50 per ton for a haul of some 2,150 miles, basing from interior points east of The Dalles.

After consideration of mine products, timber and grain, the next heaviest traffic movement on the O. R. & N. is that of manufactured articles, which aggregate some 9 per cent. of the total movement. Much of the general merchandise comes into Portland and is distributed back again. There is also a good movement of wool, aggregating about 8 500 tons per year, which goes entirely to the Atlantic seaboard (Boston). The total Oregon clip of wool is about 10,000 tons a year. Oregon also has a hop crop which ranges from 100,000 to 150,000 bales of 200 lbs., one of these 200-lb. bales of hops being as large as a bale of cotton. Hops are a very uncertain commodity from the standpoint of the man that raises them, the prices going through extreme variations from year to year.

The passenger traffic of the Oregon Railroad & Navigation Company, with that of the other Harriman lines in the West, has its greatest importance in its effect in building up freight traffic. The West is under-populated, and probably will remain under-populated for a great many years. The need for oriental labor for the farmer and the fruit grower is paramount, yet the political obstacles are such that hope in this quarter is remote. Briefly, the aim of all railway passenger departments in the Far West is to take the agricultural population of Illinois, Michigan and Iowa and move it bodily out to Washington, Oregon and California, by persuading it that the western soil is better, the western sun is warmer, and the western season is longer. These facts must always be kept in mind in viewing the passenger work of the western lines. The Harriman people have perhaps the best system of all for bringing this about, through their "community" plan.

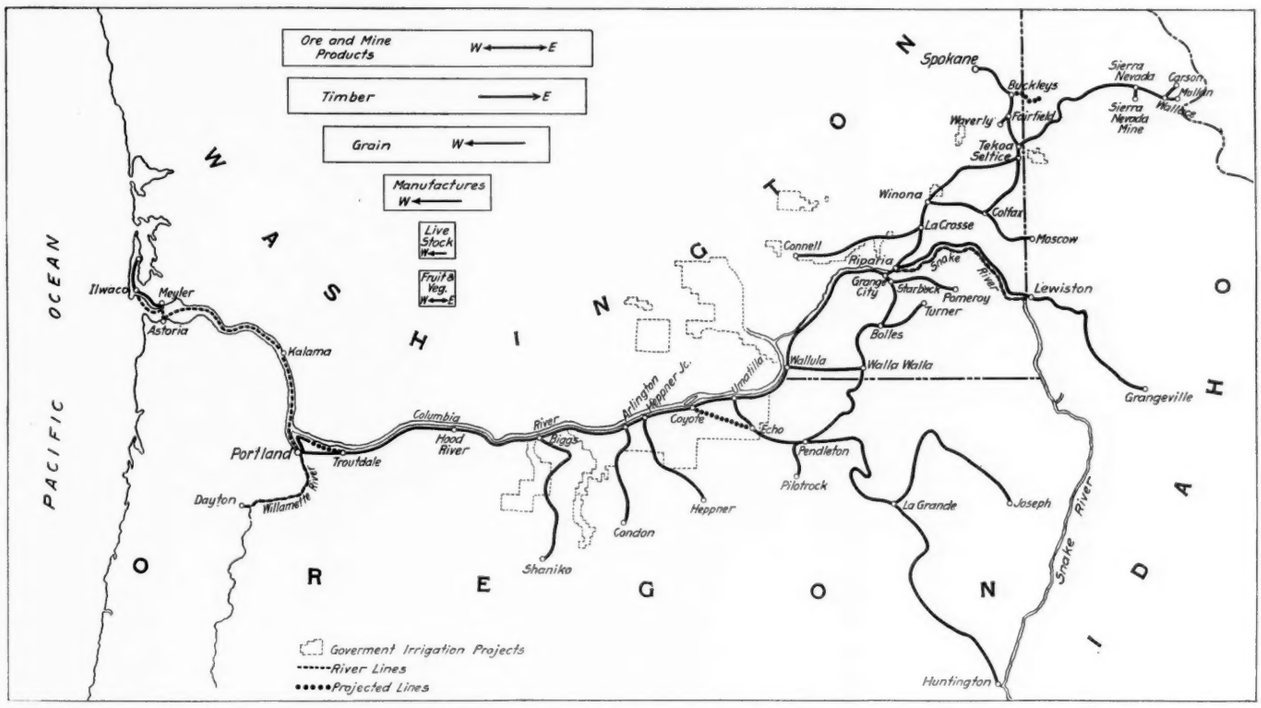
The Harriman passenger departments in the West go to

enterprising communities where there is fine opportunity for raising apples, or oranges, or wheat, or alfalfa, and stimulate the local board of trade or commercial club or similar organization to co-operate with them in their plan for drawing attention to the community. Then an elaborate and beautifully illustrated pamphlet is gotten out, printed on heavy paper, and showing in natural colors and in full size pictures of the apples or oranges or other fruits that characterize the locality. A special feature of these pamphlets is a map of the entire railway system together with connections from Chicago and New Orleans to the coast, on which the specific community in question is starred, and its name is printed in large, full-faced type, so that all the rest of the United States is made subordinate to Hood River, or Grant's Pass, or whatever the specific locality may be.

The community supplies the information and pays costs of publication; the railway has its expert photographer and pamphlet maker do the work (without charge for his services), and distributes the pamphlet at its own expense, except in so far as the pamphlets may be distributed by the community.

ber. The community plan has been going on for about a year, and in the first two weeks of the colonist period this year the O. R. & N. had 1,000 colonists more than it did in the same two weeks last year, while the communities have contributed well above $50,000 to the pamphlet campaign. In March and April the O. R. & N. moved about 10,000 colonists, and in September and October, 1908, about 8,500.

Three or four points of considerable interest stand out prominently in an endeavor to survey the future prospects of traffic on the Oregon Railroad & Navigation Company. It is probable that grain from Manchuria will before long compete with Columbia river grain in the Orient, and that the heavy shipments across the Pacific from Portland and other Columbia river points will be reduced. This will not necessarily affect the coast railways, however, because it is certain that the home demand for this grain will increase rapidly year by year. The difference will be that the grain will move to San Francisco and various local distributing points, instead of going to Europe, Asia and Africa. The chances are that it will take a higher rate rather than a lower one.



Oregon Railroad & Navigation Company.

The enclosed areas show the proportionate commodity tonnage movements, and the arrows show the direction of principal movement.

The result is that each western town is enabled to make the best possible presentation of its own case; a far better one than it could make without the able experience and systematized help of the railway company.

The Harriman lines have been extremely wise in concentrating attention on this aspect of the case, and have succeeded not only in increasing greatly the emigration to western points by their community system, but have altered enormously the former attitude of hostility which was directed at the railway. It is hard to feel unkindly towards persons with whom you are working shoulder to shoulder for mutual helpfulness.

The heaviest passenger movement on the Oregon Railroad & Navigation Company is on the line from Portland, Ore., to Huntington. Local passenger business slightly exceeds through interline business, and there has been a steady increase of suburban business around Portland. This business was nearly 50 per cent. greater in 1908 than in 1907.

Colonist travel moves in March, April, September and Octo-

The growth of the lumber tonnage in future years is also an interesting matter for speculation. There are some 300 billion feet of standing timber in Oregon; more than in any other state in the Union. Great areas of this are now far remote from the nearest railway, and the tendency of the future will probably be to build, slowly and gradually, a network of short feeder lines out into the timber, much as has been done in the southern states. This movement must come slowly, however, for timber shortage exists more in the future than in the present, and it would now be a comparatively simple matter to overstock the market. Manufacturing industries are still in their infancy on the Pacific coast, and all the established lines have a most hopeful future in the gradual growth of these industries, and in the haulage of coal and raw materials to them, and manufactured goods out again. The freight traffic of the coast, as has been said, is a raw material traffic, and a raw material traffic in which coal figures very little. Both coal and oil, however, can be found reasonably near at hand when the demand for them arises, and the day

when this demand comes will be a day of large, new earnings for the Oregon Railroad & Navigation Company and all the other lines serving the coast states. In the meantime, the road is very prosperous with its existing business, and is increasing in prosperity. Gross earnings in 1908 were $14,149,704, or well over $10,000 a mile.

TRAIN RESISTANCE.

BY A. STUCKI.

Instead of giving new formulas and new values in this already very perplexing question, the author intends to deal with the information already at hand and collected during the last 75 years, and an attempt will be made to show the different elements entering into train resistance, and especially to point out the different conditions under which each of these elements will appear. In this way, there is no doubt, a much better understanding can be obtained of the greatly varying and apparently contradicting information procured up to this time than by adding results of other tests, which again would differ from anything obtained so far.

For simplicity sake let us consider a 40-ft. gondola car, loaded with lumber to the clearance line, car and lading, 76 tons, load on all the journals, 143,500 lbs., passing a curve at 30 miles per hour.

GRADE RESISTANCE.

The grade resistance is simply 20 lbs. per ton for 1 per cent. of grade, regardless whether the car is loaded or empty, on a curve or tangent—hence this item will not be further discussed.

JOURNAL FRICTION.

The journal friction consists of the load on the journals, times the coefficient of journal friction, times the diameter of the journal, divided by the diameter of the car wheel. With our car we get: 143,500 x 0.01 x 5.5/33 or 239 lbs. per car or 239/76 = 3.1 lbs. per ton.

The coefficient of journal friction in this case was taken as 0.01, which represents average conditions with a good lubricating oil. It may seem strange that the quality of the oil and the method of applying it has really more to do with it than the composition of the bearing metal. If the journal would run in oil, the coefficient would decrease to about one-sixth or one-eighth of the figure used, and if the oil is unevenly and improperly applied, this same coefficient of friction may increase to many times the value used above.

The oil in itself has to be of such a character so as even under a maximum load to be able to keep the two bearing surfaces apart. This being the case, the maximum load on the journals will cause a minimum of resistance, with other words proportionate.

Decreasing the load will not decrease the frictional resistance in the same proportion; indeed, it decreases only very slightly. This is one reason why a locomotive cannot pull so much tonnage if the train consists of small or empty cars as it can if the tonnage is formed of high capacity cars, loaded to their full capacity.

As the speed increases from 0 to possibly 30 miles per hour, the coefficient of friction gets smaller, but from there on it has been found to increase again. The temperature has a similar effect. As it increases, this coefficient gets less, until about 100 degrees F. are reached. Beyond this conditions change, and it is only natural that temperatures that are high enough to destroy the desired consistency of the oil will produce bad results.

We have also some journal end friction between the collars of the axle and the brasses, owing to the lateral pressure, produced by the car passing a curve. This lateral pressure on a 400-ft. radius and with a velocity of 30 miles per hour is 11,560 lbs. per truck. This gives us an additional resistance of 11,560 x .01 x 3 ÷ 16½ = 21 lbs. per truck or 21/32 = .66 lbs. per ton (.01 being coefficient of friction, 3 in. being distance from center of axle to midway of collar and 16½ in. designating the diameter of car wheel).

WIND RESISTANCE.

The wind resistance for the car in question would be $C V^2 A$, C being a constant — 0.001 for the first car, 0.0001 for any intermediate car and 0.00026 for the last car of a train; V being velocity in miles per hour, and A being the cross-sectional area of the car. We then have: $0.0001 \times 30^2 \times 70 = 6.3$ per car or 6.3/72 = 0.09 lbs. per ton.

The above constants have been used by Prof. Goss. The wind friction along the side of the car has not been considered, being very small in calm weather, and it is plain that even the face wind resistance, as given above, is very small for such a moderate speed and adds very little to the total train resistance. Of course, box cars, when running light, are very much at a disadvantage, but flat and gondola cars, especially when loaded with steel or other heavy material, will almost eliminate any resistance of this sort. A solid box car train suffers less in this respect than one where flat, gondola and house cars alternate.

ROLLING FRICTION.

Mr. Fowler in his experiment (See Proc. Pittsburgh Railway Club, Nov. '07) has found that by increasing the load on a wheel the area of the flat spot between the rail and the tread bears the following relation.

Load per wheel.	Area of spot.	Diameter.
6,000 lbs.	0.11 sq. in.	0.38 in.
10,000 "	.12 "	.39 "
11,500 "	.13 "	.41 "
14,500 "	.15 "	.44 "
16,500 "	.17 "	.47 "
17,500 "	.18 "	.48 "
19,000 "	.19 "	.49 "
25,000 "	.20 "	.51 "

The last column was added by the author and was obtained by considering these spots as being practically circular and figuring the diameter the same. This shows that although the loads have more than quadrupled, the diameters have increased but slightly, indicating that the rolling friction on heavy cars is considerably less in proportion than on light and empty ones.

All the above figures are based on similar conditions of rail and tread, while in actual service often great differences exist as to roughness of the surface, irregularity of the contacting parts and character of the materials. All these three items affect the rolling friction, and it is possibly due to this fact that the data in this respect is very incomplete and varies greatly. However, taking Thurston's middle value (0.002) as coefficient of rolling friction, the radius of the wheel, of course, being about 1⅓ ft. and the weight on the rail of the car in question being 152,000 lbs. we get:

$$\frac{152{,}000 \times 0.002}{4} \times 3 = \text{lbs. per car or } 228/76 = 3 \text{ lbs. per ton.}$$

FLANGE RESISTANCE.

When a car approaches a curve the front truck will keep on in a straight line until the flange of the outside wheel strikes the rail, unless the truck is very flexible, so that the cone of the tread will sufficiently accelerate the wheel to keep up with its mate on the inner and consequently shorter rail. This latter condition exists on an arch-bar truck.

But in order to be able to adjust itself, as indicated, the truck bolster must swing relatively to the body bolster. If they were locked the truck could not swivel and the wheel would have to climb the rail. If they are partly locked, for instance, by the friction of the side bearings, the wheel will not any longer have to jump the rail, as the pressure between the flange and rail will simply increase until it is sufficient to overcome the friction of said side bearings. That this pressure at times is very great the following figures in connection with the accompanying sketch in the next column will show.

We have about 68,000 lbs. on each truck center plate, and

assuming that the centrifugal force in passing the curve is .2 of the load (the maximum is .4), and further assuming that the center of the plate forms the inner support of this load, we get on the outer side bearing 29,600 lbs., and the balance—or 38,400 lbs.—on the center plate. With ordinary side bearings and a coefficient of friction of .2, the truck in swinging around would have to overcome 29,600 x .2 lbs. in friction, working on a lever arm of 25 in., making 148,000 inch-pounds.

The load on the two outer wheels will be found to be 58,300 lbs., and naturally the balance, or 17,700 lbs., rests on the inner wheels. When the outer wheels are coming toward the flanges, trying to get ahead, they are prevented from doing so by the side-bearing friction. It is true the hold on the outer rail is greater than that of the side bearing, but the hold on the inside rail is small and the wheels are bound to slip. But before they do so they help to overcome the grip of the side bearings to the extent of 17,700 x .2 x 30, or 106,200 inch-pounds, leaving the balance of the grip, or 148,000 — 106,200, or 41,800 inch-pounds for the wheel flanges of the outer wheels to take care of. The lever arm, in this case, being 33 in., gives a lateral pressure on the flange of the front wheel equal

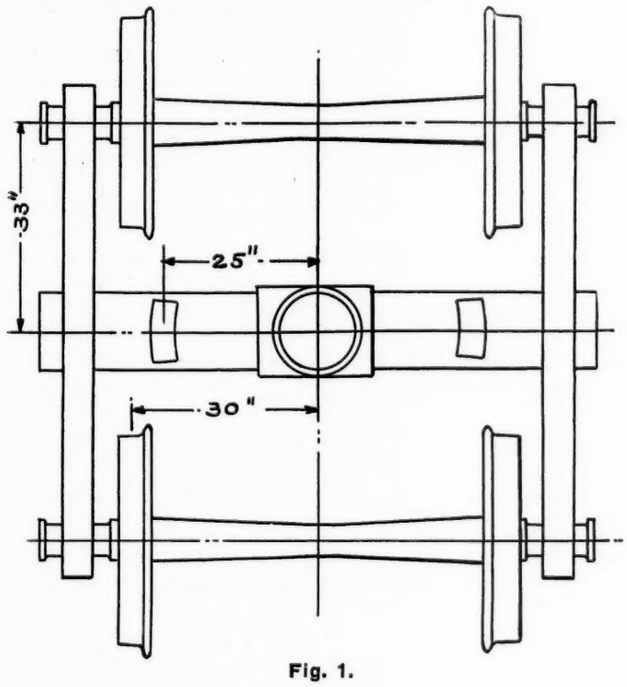


Fig. 1.

to 41,800 ÷ 33, or 1,270 lbs. Taking the coefficient of friction between the flange and the rail again as .2, and their contact with each other 3 in. ahead of the whel center, we have a flange resistance of 1,270 x .2 x 3 divided by the wheel radius, or 16½ or 46.2 lbs. for each outer front wheel, i. e., per truck, and 46.2/39 or 1.2 lbs. per ton.

Often the pressure on the outer side bearing far exceeds the figures above taken, even at moderate speeds. This is especially the case with superimposed loads, large side bearings and faulty roadbeds. Even the flexibility of the truck springs will, to some extent, augment such undesirable conditions. This, however, cannot be avoided. But the clearance between the side bearings should be kept as small as possible.

On wooden equipment, that is to say, with wooden bolsters, this very question caused the railways a good deal of trouble on account of being flexible. For this reason, the side bearing clearances had to be made very large, often ¾ in. and more, so as to avoid the risk of both sides becoming solid which, of course, would prevent the truck from swivelling. As a result of this, such cars often swayed from side to side even on a straight track, delivering a blow to truck, car and lading at each reversal.

With the introduction of steel bolsters, a decided advantage has been gained, inasmuch as they are much stiffer, and the M. C. B. Association has now decided that ¼ in. per side as a minimum would be safe enough.

With a true anti-friction side bearing, one which does away with all friction, this question is at once solved, in view of the fact that we can adjust them just as close as we wish to, and if they should even touch that much better, as we simply would have a steadier riding car and yet a fine swivelling truck.

Another important advantage of a closely adjusted side bearing is the reduced wear of the center plate. As is well-known, a large area to carry such a tremendous load continually is absolutely imperative. This was demonstrated beyond doubt when some five or six years ago the railways went back to a 12-in. center plate. But as long as a large side bearing clearance is allowed, the center plate will not get the benefit of its full area; on the contrary, it will be allowed to sway from edge to edge.

Following the example of flange resistance and adding the corresponding figures for greater centrifugal forces we get:

Centrifugal force.	Load on side bearing.	Load on outer whls.	Load on inner whls.	Resistance per ton.
0.2 of load	29,600 lbs.	58,300 lbs.	17,700 lbs.	1.2 lbs.
.3 " "	41,400 "	67,100 "	8,900 "	15.5 "
.4 " "	53,200 "	73,700 "	2,300 "	80.0 "

These figures do not include the impact due to the heavy mass of the truck being suddenly deflected from its straight course when striking a curve. However, they show how futile it would be to deduct a theoretical formula to take care of all the possible conditions existing in the daily service, and the best we may hope for is an average empirical value for average conditions. One-half pound of resistance is often considered a fair value per ton for each degree of the curve.

Is it any wonder that there is a strong desire to do away with these resistances, as shown in the last column, especially since it can be done by simply using frictionless side bearings? As long ago as 1902 the many opinions of railway officials, as given by the Committee on Side Bearings and Center Plates in their report, indicated that good results had been obtained wherever they were tried, and one road, after having used them extensively for over seven years, found that the power to haul a train around a curve was 10 per cent. less by using anti-friction side bearings.

It is true on a straight track there is no such reduction and if a railway company would be fortunate enough to have practically all straight tracks or if their limiting point in rating the engines would be, for instance, an inclined track without a curve, then the rating would remain the same, but the coal pile "would still suffer in passing a curve."

Besides that, the abrasion of the rails and wheel flanges is undoubtedly the most serious feature of this whole question. In 1902 in the committee report just mentioned, Mr. Bryan, Master Mechanic of the Duluth & Iron Range, reported that on his road the flange wear was very much reduced by the use of anti-friction side bearings. He equipped 300 cars with such a device and another 300 cars in the ordinary way, and he found that after a certain period 16 wheels of the first lot only, but 101 wheels of the second lot, were removed from service on account of having worn flanges. Such a tremendous saving sounds almost miraculous but it has been fully corroborated by the experience on other roads. For instance, the Pittsburgh & Lake Erie during a period of three years found that the percentage of wheels removed for worn flanges was 39.2 per cent. on cars with ordinary side bearings and 2.1 per cent. for cars with anti-friction side bearings.

Grinding off all these chilled wheel flanges on rolled steel rails must mean a tremendous amount of power used up unnecessarily, wheels and rails destroyed and time lost in restoring the injured equipment.

In pulling a long train slowly around a curve, the elevation of the outer rail in this case will cause the car to tilt inward

and to ride on the inside bearings, resulting in similar conditions, just shown by the preceding table. But aside from this we will meet a new resistance which so far has not been considered, and which is caused on account of the whole train, like a rope on a drum, pressing inward towards the center of the curve. Naturally this inward pressure increases with the length of the train and inversely as the radius of the curve, the pull of the locomotive being the same in all cases.

Let us assume 50 empty cars, 20 tons each, on a 4 deg. curve. The train in round figures is 2,000 ft. long and covers a little less than one-fourth of the circle of the above curve, figuring 80 deg. The lateral pressure on the rail, 10,000 lbs., being approximately the drawbar pull, is $\frac{10,000}{2} \times \pi \times \frac{80}{180}$ or 7,000 lbs.

This lateral pressure between wheel flange and rail, 3½ in. ahead of the wheel center, will, with a coefficient of friction of .2, amount to $\frac{7,000 \times .2 \times 3}{16\frac{1}{2}}$, or 254 lbs. resistance per train, or .254 lbs. per ton.

If the train would consist of loaded cars, naturally the train would be much shorter and cover a smaller portion of the curve. The initial force necessary to haul such a train is also much smaller, hence the resistance from this source will be reduced very much. This is undoubtedly what Prof. Goss had in mind when he said (*Railroad Gazette*, June 20, 1902) that in a 20-car train the flange friction increases faster than in a 5-car train.

The elevation of the outer rail will also have a tendency to shift the wheels and axles towards the inside rail, but as the friction between wheel tread and rail is greater than said tendency no sliding can take place. On the contrary, this friction will even minimize the resistance due to a slow haul around a curve.

Coming to a close, we will for convenience sake repeat some of the figures dwelt upon above in order to show how the train resistance of the car mentioned in the beginning of this article is made up:

	Per ton.
Journal friction	3.1 lbs.
Journal face friction	.66 "
Wind resistance	0.09 "
Rolling friction	3.00 "
Flange resistance	12.0 "
Total	8.05 lbs.

If an anti-friction side bearing is used, the last figure will fall away, making a total of 6.85 lbs. per ton, or a saving of 15 per cent., while the car is passing a curve.

These figures are representing only average values. In fact, they were principally given to show how the different items of the train resistance are made up. It would be, of course, a much simpler matter to measure the pull on the car itself. This, however, would not sub-divide these different items entering, neither would the various conditions necessary to determine each detail resistance ever be disclosed.

Naturally there exist conditions in a train which cause additional resistances which cannot be calculated; for instance, cut journals, poor workmanship, details being out of line, or insufficient clearance for couplers sideways. For this last mentioned cause alone the writer has seen cars forced to leave the tracks on reversed curves, and it is not hard to imagine what tremendous forces are set up between car body, truck and track in such a case. Neither will it be disputed that, although the cars may stay on the track, great internal binding takes place just the same and the natural result is additional resistance in moving the train.

According to a consular report, a German-Chinese export firm has received a large order for rails, bridges, locomotives and building materials for the Tientsin-Pukow Railway, this being in accordance with the agreement that German industries be given special privileges because of the placing in Germany of part of the last Chinese loan.

ACCIDENTS ON THE HARRIMAN LINES.

The charts shown herewith were made in the office of Julius Kruttschnitt, Director of Maintenance and Operation of the Union and Southern Pacific, to show in graphic form the number of serious accidents that took place on these roads during the calendar years 1906, 1907 and 1908. By a "serious" accident is here meant one that caused loss of life or considerable destruction of property.

It will be recalled that on these roads the causes of accidents are made public (*Railroad Age Gazette*, October 2, 1908, page 1031). This publicity plan was adopted on the Union Pacific early in 1907, and on the Southern Pacific, the Oregon Short Line and the Oregon Railroad & Navigation Company in February, 1908; and the officers take satisfaction in observing that since these dates there has been a substantial decline in the number of accidents on all the lines, both absolutely and in proportion to the locomotive mileage. The absolute decline in the number of accidents in 1908, as compared with preceding years, is, of course, largely due to the fact that the movement of traffic in the latter year was smaller; but the charts show that there were other causes operating to increase the safety of trains. The fact that in dull times the men work under more favorable conditions has its effect; but the influence of the public hearings is believed to have been effective also.

The dots which mark "unavoidable accidents" refer to such accidents as those caused by the breakage of a wheel having a latent defect that no inspection would discover; by a fire, the cause of which could not be ascertained, etc. Where there was doubt as to whether an accident was unavoidable or due to negligence, it was always construed against the road, and put in the class of "accidents due to negligence."

It has long been a common saying among railway men that accidents come in bunches of three. These charts do not show that this saying is universally true, but an examination will show some apparent foundation for it. Repeatedly, on each line, there will be found a series of from two to as many as 15 accidents on the same or consecutive days, followed by a number of days on which there were no accidents at all. A plausible explanation of this is that when no accident occurs for a number of days there will be a natural tendency for the vigilance and care of officers and men to relax. This relaxation is apt to cause accidents. When the news of them goes out over the line, everybody is apt to brace up and become once more vigilant and careful, and then there will be a period free from trouble. In so far as this is true, it affords a good argument for giving immediate and general publicity to the facts about every accident, because of the effect that this will have in putting men throughout the operating department on their guard.

While crediting publicity with having helped to reduce the number of accidents, the officers of the Harriman lines also call attention to the influence that has been exerted in the same direction by the large mileage of automatic block signals that has been installed on these roads during the last few years, and by the systematic surprise tests that are constantly being made all over the lines.

General Superintendent W. L. Park, of the Union Pacific, read an interesting paper on this subject at the March meeting of the Western Railway Club, exhibiting one of these charts. Among other things, Mr. Park said:

"Not a few railway accidents are whitewashed in the investigation to the extent that the officials deceive themselves. The evidence is often made to substantiate a preconceived conclusion as to how the incident occurred. The dominant influence of one in authority frequently asserts itself to the extent that the interrogating or giving of testimony is shaped to meet the well-known views of a superior. This influence may be unconsciously exerted. * * * It has been said that 'the science of railroading is the art of shifting responsibility.' * * * The cure of disease is dependent upon an intelligent diagnosis of

the trouble. So the prevention of accidents lies in a thorough, intelligent and unbiased investigation as to the cause—applying the remedy is not so difficult. * * * Unless railway men are willing to let the politicians take from their hands the reins and govern the railways with inexperience and theory, they must analyze the present conditions and shape the future policy in this respect in accord with the growing sentiment that accidents are of too frequent occurrence. Unless prevented to a greater degree than at present, the strong arm of the Government must intervene, be the consequences what they may.

"There are railway officials who do not know, and not knowing, fear detection. There are others who are influenced by those higher in authority; who do not have the courage of their convictions. There are also a great many who arrogate to themselves a disregard of public opinion; and there are also those who have mental inertia. A competent railway operating official ought not to fear publicity for accidents. He should be so well grounded in his methods as to invite publicity. The public will help him to place the responsibility where it belongs, and secure for him the individual responsibility which is essential to any well-managed property. As it now stands, the managers must bear wholly the odium of a disregard of the rules. If an accident occurs, the men implicated will frequently accuse of the officers of not enforcing the rule, a violation of which was responsible, alleging that custom superseded it.

"The Union Pacific is, perhaps, the first railroad adopting this method of publicity. We approached it with no little timidity, it is to be confessed. Our legal department said it would not do, as it would throw open to legal 'shysters' information upon which claims would be made for damages and personal injuries. As a matter of fact, nothing of this kind has occurred; per contra, the accident having been thrown open to full public investigation, there are no mysteries for the opposition to delve into; no vague insinuation that the great cor-

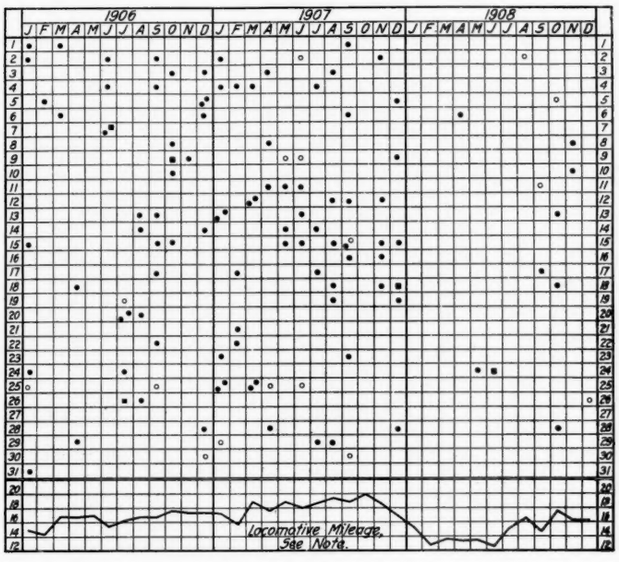


Fig. A.—Union Pacific.

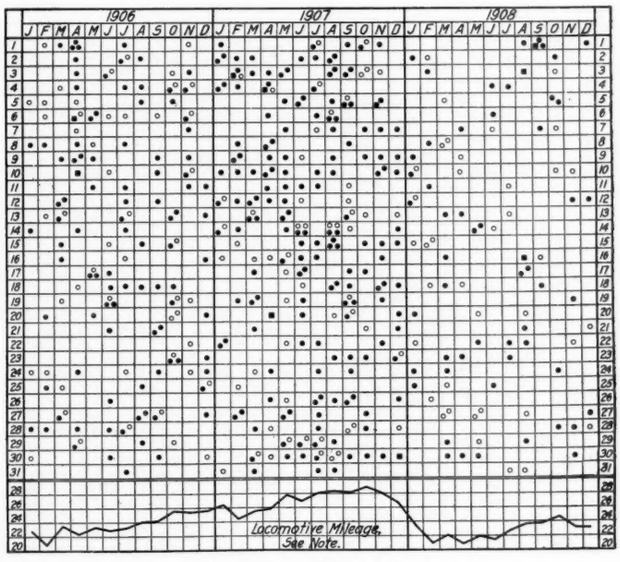


Fig. B.—Southern Pacific—Pacific System, excluding the Salt Lake Division and the lines in Oregon and in Sonora.

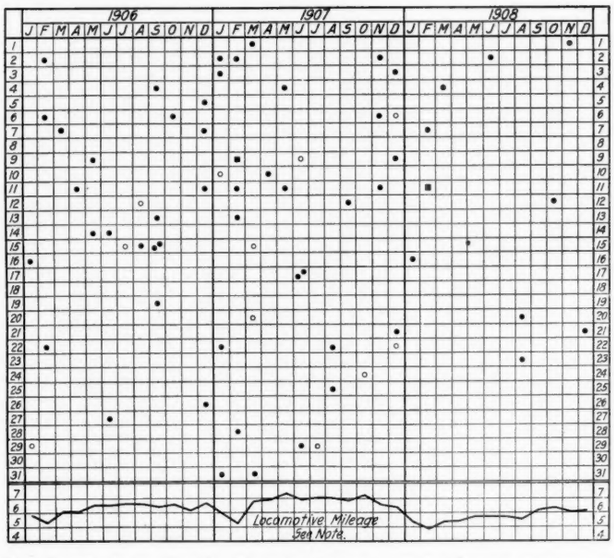


Fig. C.—Southern Pacific Lines in Oregon and the Oregon Railroad & Navigation Company.

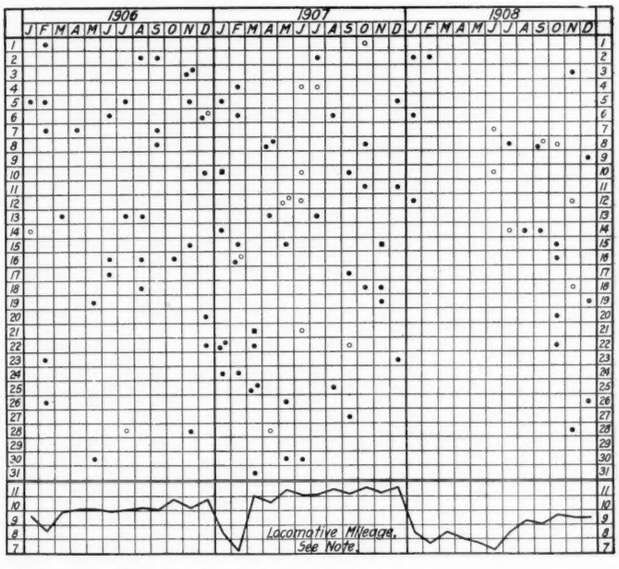


Fig. D.—Southern Pacific, Salt Lake Division and Oregon Short Line Railroad.

Dates of Serious Train Accidents on Union Pacific and Controlled Lines, Years 1906-'08.

NOTE.—A dot represents an accident due to negligence; and a circle one classed as unavoidable; a solid square means a broken rail. The number of miles run by locomotives each month is indicated at the bottom of each diagram in hundreds of thousands of miles. For example: Fig. A, October, 1907, 2,000,000 miles; Fig. B, August, 1907, 2,815,000 miles.

poration is crushing the helpless client by suppressing the facts—which is always a stock argument with the plaintiff in a damage case. That such investigation helps the legal department there is no doubt."

EXAMINING TRAIN MEN.*

Before coming South, I took part in preparing several books containing upwards of 1,000 rules each and looked upon them as masterpieces. Were I to make another book to-day, I would try to give all necessary instructions in not more than 50 special rules.

As for train orders, I believe that these, like the Morse instruments, within a decade will be out of date. There will be no such thing as moving trains by written train orders, as the block system will render them unnecessary, and the telephone seems likely to put every Morse instrument in the scrap heap.

It is one thing to make rules, but quite another and a far more difficult problem to enforce them. * * *

It is wise to print only such rules as are absolutely necessary, otherwise, possibly, you will find that in the rush your book of rules will not be complied with and then you will be placed in the embarrassing position of having to admit that your rules are impracticable and cannot be kept in mind.

There is one valuable and necessary rule which easily can be, but rarely is, respected and which we should make a more earnest effort to enforce. I refer to Rule 14 relating to the steam whistle. Aside from a great excess of unnecessary whistling, there is altogether too much improper whistling. Some freight enginemen seem to be under the impression that they are not earning their salary unless they whistle at least once every half mile and about fifteen times at each station. The code rule is not impracticable, nor is it unreasonable to insist that enginemen pull their whistles properly. If this is done properly on any road in the United States I have yet to ride over that road. The rule very clearly sets forth that two medium long whistles is a signal to release brakes and every railway man also knows that that is the proper signal to sound when acknowledging a proceed signal, but two short are invariably used to indicate start, as well as in answer to a signal to stop. Probably no one whistle signal in existence is more dangerous than the two short as generally used. Instead of sounding one long for stations, enginemen generally call for brakes. It has been said of the code that it prescribes a dangerous combination, one long and three short to send out a flagman, and one long and three short to indicate stop at a flag station. As sometimes used, it is unsafe, but there is no similarity whatever when properly sounded. Enginemen should wait three seconds after whistling for a station before sounding three short in answer to the conductor's air signal to stop at that station. They should also sound the station whistle for three seconds.† I often hear enginemen call for signals by using four long blasts, instead of four short. It never seems to occur to them that four long calls in a flagman from the South. I have heard an engineman call in a work train at a station by four long, instead of one long, which is not misleading. "Tapering off" is an abomination. Perhaps no one combination is more often sounded improperly than the public crossing whistle. . . .

Were you to ask me at this time to outline the best method of examination, I could conscientiously answer you only in one way: I really do not know. So much depends on the person being examined that nearly every man who comes up seems to present a new study or problem. We must get at him in a different way. We have to make use of many different illustrations to get a fact clearly fixed in his brain. After having worked on rules and orders for years I have about reached the conviction that to sit down and read the rules, explaining their meaning, and how the company wishes them understood and respected, is about as good a way as any to examine an employee. The use of several hundred questions, to be answered by the employee in his own way, gives a good general idea of a man's intelligence, and this is not a method to be despised; but few men, comparatively, can clearly express themselves in writing; or, after having answered all questions to the satisfaction of the examiner, they still may be just a little at sea in some important particular. An explanation by an examiner makes all doubtful points clear, and he is also able to elaborate by example after example until the examinee cannot fail to fully comprehend. I have always felt that a percentage examination was faulty and of doubtful value. It is unreasonable to assume that many employees will attain 100 per cent., and 90 or 95 per cent. generally is accepted as satisfactory; but when the paper is laid before the superintendent may it not be true that the questions missed are far more important, relatively, than those answered, or that men have answered questions by rote without in all cases actually appreciating the importance of or exact meaning of a rule?

*From a paper by H. W. Forman, Train Rule Examiner, of the Nashville, Chattanooga & St. Louis, read at a meeting of the Nashville Association of Railway Officers, April 24. Following his address, Mr. Forman displayed 200 train orders. He explained certain dangers liable to arise from combining two orders and pointed out the improper features of faulty orders.

†We move to amend to read two seconds.—Editor.

NOTES ON RAILWAY ELECTRIFICATION.*

BY JOHN A. F. ASPINALL.
General Manager of the Lancashire & Yorkshire Railway.

There is nothing so coy as capital, and if it is to be won, it must be by convincing arguments, and not by the doubtful pleadings of conflicting interests. It is probably certain that what may be called the "battle of the systems" has had the effect of causing railway companies to defer electrification until they could see that engineers were not at variance as to the system to be adopted. I have no intention of dealing with the controversial point raised in the "battle of the systems." Those who are interested will find in a recent short paper read by F. W. Carter before the Rugby Engineering Society a very clear statement of the kinds of work to which the different systems can be applied with advantage.

In dealing with the general subject, I do not for one moment suppose that I shall be able to give any additional information to those railway and electrical engineers who have already made it the object of special study. Possibly any remarks I may make will be of interest to those who have not hitherto gone into the question. It is too often stated that a general electrification of our railways would be of great advantage. A careful examination of the subject, however, appears to show that while there are certainly instances in which this work can be undertaken with great commercial success, each individual case has to be considered with the utmost care, not only on account of the costly character of the work, but because the conditions upon which success or failure depend vary in almost every place or district. The length of haul, the density of the traffic, the necessity or otherwise of express trains, the presence of steam trains, the proximity of signal boxes, the density or scarcity of population at different points of the line, and the continuity of the flow of traffic during those hours which are not "rush hours," and a variety of other circumstances, will affect the commercial prospects of such an enterprise. In dealing with the question of electrification before the Railway Congress at Washington in 1905, I said that the Lancashire & Yorkshire Railway had not gone into the work to "save money, but to make money." I further pointed out that it enabled us to defer for a long time any increase in the capacity of our terminal stations. I did so in the following words:

"Every time a locomotive train comes in or goes out you have four platform operations and eight signal operations. First of all, the train comes in, then a locomotive follows it, that is two; then the train goes out, that is three; then the loco-

*From the Presidential address before the Institute of Mechanical Engineers, April 23, 1909.

motive which brought it in goes out, that is four platform operations, which means eight signal operations. The electric motor train comes in, that is one; the motorman goes to the other end of the train, and the train goes out, that is two. You have only two platform operations, and four signal operations. The result is that, by using your motor car trains instead of locomotives, you double the capacity of your terminal accommodation."

To warrant the electric equipment of a main line of railway dealing under present circumstances with long steam-hauled trains at high speed for long distances without a stop, some great commercial advantage must be shown. The public are not likely to pay more than they do at present, and it therefore becomes a question as to whether electrical working would induce much larger numbers to travel and to travel more frequently. What would be the advantage which would weigh with them in taking more frequent journeys? The speed of trains, say between Manchester or Liverpool and London, is at present very high, some trains doing the journey without a stop from London to Liverpool (Edgehill) at 55.3 miles per hour, or from London to Manchester (Stockport) at the same speed. This would appear to be quite sufficient to satisfy the ordinary business man, who can go and return from London and arrange his journeys so as to have a clear five hours in town. If we assume a most extravagant figure, and say that trains would be run at 120 miles per hour, and the time occupied reduced by one-half, the probability is that the commercial gain to the traveler would be very small, while the increased cost to the railway would be enormous. In addition to the great first cost, say some millions, and assuming such fast trains to be run on the existing lines of way, the general usefulness to the railway company of any one track would be materially reduced, as the margins of time, before the approach of such trains, would have to be materially increased for the sake of safety, and the slower stopping trains which are interwoven between the expresses of to-day, would, to a large extent, have to be carried on other tracks. The earning capacity of what may be called, for the sake of distinction, the express track, would, therefore, be decreased. The existence of a considerable population in two towns some miles apart, without any large number of intermediate towns with a traveling population to feed a railway, would not be sufficient warrant for electrifying an existing steam road destined to carry high-speed trains. It is probable that with two towns twenty miles apart such a railway could not, in our present state of knowledge, succeeed financially compared with a steam-worked road. The cost of widening any railway the capacity of which has, owing to growing traffic, become too small for dealing with steam trains, should be carefully compared with the cost of electrifying the existing lines, with a view of seeing whether the additional capital required for electrifying would or would not exceed the cost of widening. In the case of many suburban lines from our great cities, electrification will at once double the train-carrying capacity of the tracks, while in others it will allow for an increase in capacity, and yet leave a greater time space between trains which may be utilized for the passage of steam-worked express trains coming in from the more distant parts of the line. To electrify any suburban railway, and to arrange the time table in such a way as to leave trains running at the same speed at which the steam trains formerly ran, would be to throw away most of the advantages of the change, though the working costs could be kept very low. An increase of speed, coupled with greater frequency of trains, will soon begin in a populous district to yield that flow of traffic which may naturally be expected from such facilities, but it must at once be recognized that higher speeds and more trains cost money. If, therefore, the district is not one in which there is a probability of a growth of traffic nothing can be gained. In a district where a railway has had its tracks paralleled by tramways running for some distance from the terminal of a great city, the creation of an electric railway service will have the immediate effect of bringing back to the line of railway large numbers of those passengers who have used the trams in the early stages of their construction, but who find that they cannot tolerate the great waste of time which results from the very slow speed and the many stops due to the crowded streets through which the trams have to run. It must, however, be remembered that unless an electrified railway can be continued for some distance, so as to earn a good average fare, stations which are close together and but a short distance from the great city, will yield very low fares without giving any opportunity of picking up the ever-recurring penny paid by the short-distance traveler on the trams.

Sir Herbert Jekyll, in his report to the Board of Trade on London traffic, points to the fact that one railway running northwards out of London is prohibited by law from stopping at intermediate stations unil it has got 9 miles out of London. Although this distance is probably in excess of what might be termed reasonable, such a railway, being electrified, would be saved the drawback of having to start out of the terminals with a heavy train of great seating capacity which would empty rapidly at the short-distance stations, and necessitate the haulage of a considerable weight of empty stock to whatever distance the line might be extended. The main object should be to induce a large number of people who have business in the towns to live further out, and so bring up the average fare of the railway (which has to pay for its wayleave, its land, its stations, and its signalling), to such a figure as will make it profitable, leaving the very short distance traffic to the municipal tramway, which has its right of way in the public streets, and has advantages which the railway cannot possibly obtain. Some of the advantages of electrification for local services are:

(*a*) High schedule journey speed.
(*b*) Much more frequent service when required.
(*c*) Increased acceleration and deceleration.
(*d*) Greater possible mileage per train per day, increasing the earning capacity of any given quantity of rolling stock, and increasing the loading and unloading capacity of existing platforms.

On lines of railway where third-class carriages only are necessary, great advantages in operating are gained, but there are parts of the country where the demands of the public are such that it is absolutely essential to run two classes (first and third), and where this is the case, and it is necessary to provide smoking compartments for each class, considerable difficulties in the reduction of train weights are met with; but if care is taken in proportioning the seats to the requirements of the public, the higher fares obtained from the superior class more than overbalance the additional cost of operation.

Any company which determines to convert its line from steam working to electrical working must be prepared for some difficulty in dealing with the less thoughtful sections of the public, who are unwilling to recognize the necessity for some of those delays which during the initial stages are inevitably connected with such a considerable change in methods. Notwithstanding these little troubles, one may say with R. L. Stevenson that—

"The conditions of conquest are easy; we have but to toil a while, endue a while, believe always, and never turn back."

LIVERPOOL-SOUTHPORT RAILWAY.—In describing the particular instance of conversion to which I have referred, I propose to deal with that section of the Lancashire & Yorkshire Railway which has now been electrified for some time, and of which the working results are known, and which has been commercially successful. The Southport branch of the Lancashire & Yorkshire Railway is a coast line 18½ miles in length, having fifteen stations upon it. The total length of electrified line in and about this district amounts to 4 miles of four tracks, and 25 miles of double tracks, making a total, if sidings are included, of 70 miles of single track. After leaving Liverpool, all the stations are close to the sea. Many of them are situated in

the midst of attractive residential districts, and were thus likely to produce additional traffic, if good traveling facilities were provided. For some distance from Exchange Station, Liverpool (about 4½ miles), the railway runs parallel with the line of docks, near which there are several large goods stations. To deal efficiently with the considerable goods traffic, as well as the numerous steam passenger trains, there were four lines of way from Sandhills Junction up to Seaforth, and then two lines of way on to Southport. On the length where four lines of way existed there were four passenger stations, each having four platforms, with all the necessary waiting rooms, etc. All these platforms were required, and were used in the days of steam trains. As a matter of convenience. all four lines were electrified, and two of them are looked upon as being desirable for spare lines over which passenger traffic can be passed in the event of any obstruction occurring on the eastern lines, over which, with the exception of one or two through trains, all the electric trains are now run. Although the frequency of trains has been more than doubled, the rapid acceleration and the increase in the average speed of travel has enabled the whole of the work, with the exception mentioned above, to be done on two lines of way, thus dispensing with the staff, and enabling the waiting rooms and other buildings on the western lines to be shut up, and permitting the western lines to be used almost wholly for the steam-worked goods traffic, allowing it to flow to and from the various yards without any interruption from passenger trains. This may be looked upon as a distinct gain to the railway in capacity for handling traffic. Here the cost of electrifying is a set-off against the necessity for widening and laying additional lines through a most expensive district, which would in time have become necessary if steam working had been continued or passenger trains. During the first year of electrification, and at an early period, when the increased service had shown the public the advantage of greater frequency (with the result that 14 per cent. more people were making use of the trains), it was interesting to note that the total weight of the rolling stock moved in a day between 5 a. m. and 12 midnight was 69,160 tons, against 78,393 tons in the days when steam was used. A diagram, Fig. 2, has been prepared to illustrate this, the dotted lines showing the weight of the steam trains, including the locomotives, and the full lines the weight of the electric trains during different periods of the day. A considerable addition to these weights has been the natural result of an increase in traffic since 1904.

The suburban service on the Liverpool & Southport electric line is considered to be the fastest service of such a character in existence. The stopping trains on the Southport line run 18½ miles, stop fourteen times, and do the journey in 37 minutes. The express trains, which are much easier to work, run the same distance in 25 minutes. The trains get into speed very rapidly, and are running at 30 miles an hour in 30 seconds from starting, though this varies with the number of cars. If any one were to compare the costs of operation of such a railway with another electrical line working under altogether different conditions as to speed and weight of trains and the number of stopping places, the figures would be somewhat misleading, if they were not studied with a knowledge of all the facts.

During the transition stage from steam to electrical working, there came a period when it was necessary to run steam trains in between the electrical trains at the same speed, in order to keep them out of the way of the latter. This afforded an opportunity of comparing the coal consumption of the locomotives and the power house, and it was found that the 6-wheel coupled tank engines, which did the work in 1904, consumed 80 lbs. of coal per train mile with express trains, and 100 lbs. with stopping trains. This excessive locomotive consumption was due to the high acceleration required. The consumption of coal at the power station in 1908 works out to 49 lbs. per train mile for the electrical trains, and the consumption of current at the train is 49 watt-hours per ton-mile for the express trains, and 112 watt-hours per ton-mile for express and stopping trains, including all shunting work.

During the period of conversion the work which is most likely to interfere with the ordinary traffic is the laying of the high tension cables in the ballast and the fixing of the conductor rails. On the Liverpool & Southport line the operation of cable laying was proceeded with first, so that the cables were completed and the ground filled up, leaving the way clear for men engaged upon track work. The method generally adopted was to open out a long trench in the daytime, and to

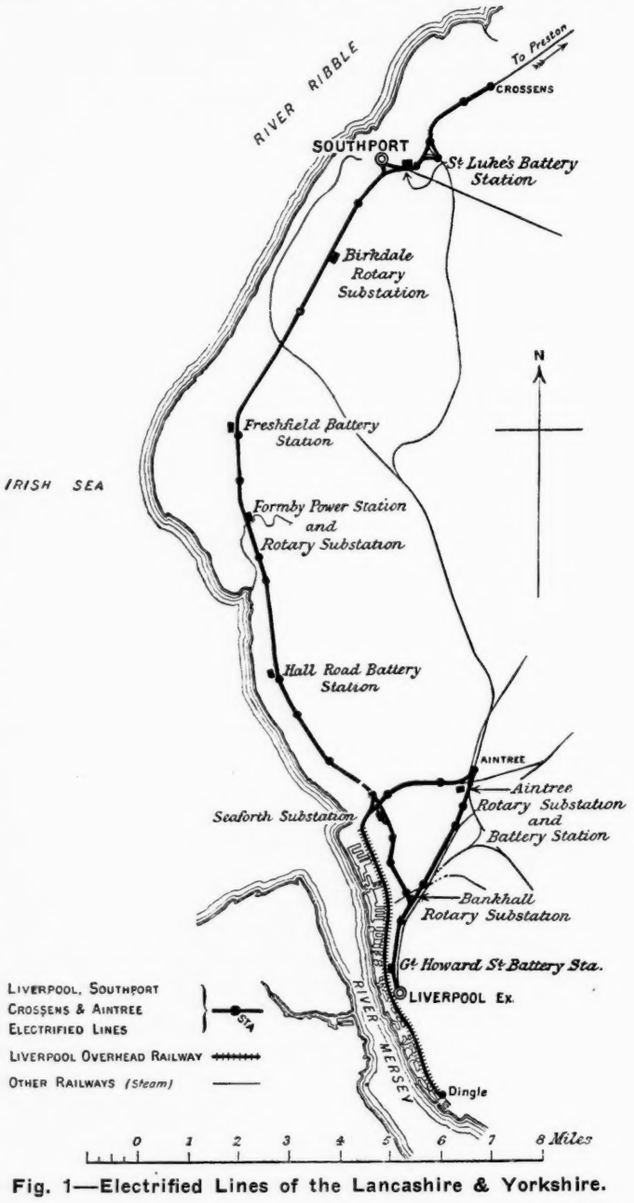


Fig. 1—Electrified Lines of the Lancashire & Yorkshire.

lay the troughing ready to receive the cables; these were brought down specially at night, the drums being mounted in suitable wagons, and uncoiled, so that the cables could be placed in the troughs, and the remainder of the work completed in the daytime. The track work, except at the busier points, such as Liverpool Exchange and Southport, was entirely carried out during the daytime, unloading of rails only being done at night. The delays to trains were never serious, and generally consisted of having to slow down when approaching and passing over the places where operations were being carried out for the time being.

The steam service from Liverpool to Crosby previous to electrification was every quarter of an hour, and to Southport every half hour in both directions, and with this number of

trains passing, hardly any trouble was caused during the period of conversion. The passing of goods trains had also to be allowed for, and it may be convenient to mention here that all good trains are still worked with steam locomotives.

The question of rapidity of conversion, after a decision is arrived at to electrify, is very important, as it is desirable to reduce to the minimum any interference with existing traffic. It is obviously of great importance also that where a large amount of additional capital is being spent, it should be made to earn money at the earliest possible date, so as to avoid loss of interest.

Once it was decided by the company that the line should be electrified, the work was proceeded with very rapidly, and the following dates will give an approximate idea of rate of progress:

1.	Order given	Oct. 22, 1902.
2.	Three sub-stations built	July 29, 1903.
3.	High-tension cables completed	Nov. 26, 1903.
4.	Power-house foundation and building erected	Nov. 26, 1903.
5.	First engine and generator completed, and H. T. current produced	Dec. 20, 1903.
6.	First sub-station complete, current supplied to line	Dec. 29, 1903.
7.	First train run experimentally	Dec. 29, 1903.
8.	Third and fourth rail work practically completed	Feb. 28, 1904.
9.	Partial service for the public put into operation	Mar. 22, 1904.
10.	Steam trains entirely withdrawn	May 13, 1904.

Total Weight moved from 5 a.m. to 12 midnight:—Steam, 78,393 tons; Electric, 69,160 tons.

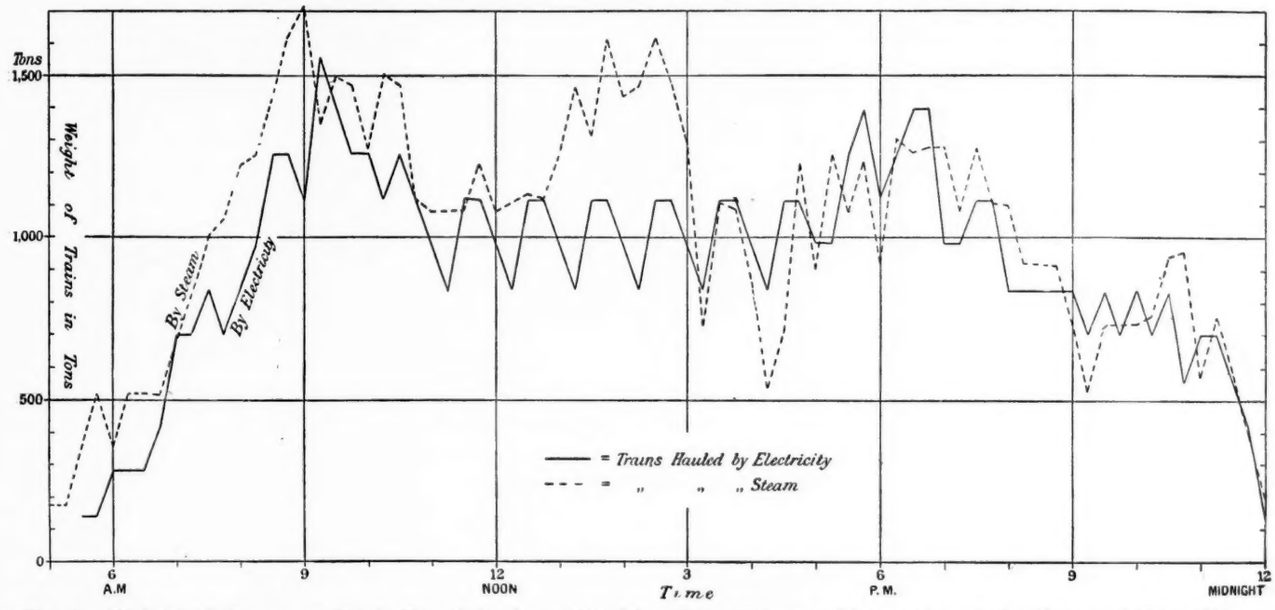


Fig. 2—Weight of Passenger Stock Moved During a Working Day Between Liverpool and Southport, 1904. Steam Before Conversion; Electric Afterwards.

RAIL WEAR.

The wear of track rails has become a serious problem on electric railways. The special rails which have been introduced by Sandberg on some railways for the purpose of preventing this wear are not the real cure for the difficulty, which is one of construction. This does not mean that the value of those rails is not appreciated, as their prolonged life would have its commercial value in other directions. Those who recollect the very early locomotives, which were built by Bury, Curtis & Kennedy, with their boilers carried as low down and as close to the axle as possible, their cylinders coming within a few inches of the rail, and placed at such an angle that the piston-rods were inclined upward towards the crank-axle, will remember the effect which they had on the permanent way, and how they had a tendency to burst the track. The modern steam locomotive, with a high center of gravity, is a very easy-riding machine and it is far less severe on the road, notwithstanding its great weight. The more or less modern motor truck has all the defects of the older-fashioned engines described above, with its extremely low center of gravity. The result is that the rail wear and tire wear are present, because the pressure which should be carried by the tread is thrown on the flange. This is because there is no elasticity, in the form of a spring, interposed between the weight above and the tire below.

AXLE LOAD.

The construction of the steam locomotive which enables the center of gravity to be placed, according to the class of engine, from 4 ft. 6 in. to 5 ft. 6 in. above the rail level, has advantages not possessed by the motor truck, in which the motor is suspended. The center line of the motor truck is in the same plane as the center line of the axle, with the result that while about one-half the weight is supported by the truck frame, and so obtains through the springs a slightly elastic support, the other half is supported directly by the axle and clipped on to it. This greatly increases the weight which is not spring-borne. Each pair of wheels under the motor cars on the Liverpool & Southport electric line, together with the other weights which are not spring-borne, makes a total of about 3 tons per axle. A motor car, with its four axles, has a total weight of 26,880 lbs. which is not carried by the springs, the weight of the entire vehicle being 103,852 lbs. The serious side wear of the rails which has taken place on the curves of railways which have been electrified is, there is no doubt, due to the center of gravity of the motor trucks being so very low down. Except for such difficulties as would be created by raising the motor itself, and transmitting its motion by suitable mechanism to the axles, and so blocking up the passages from car to car, there is little doubt that the whole weight, except that of the wheels, axles and axle-boxes, could be supported by springs. The center of gravity would then be well above the frames, with the result that the hard grinding of the tire flange which now takes place on curves would be eliminated. The conditions would then be the same as with the steam locomotive, with which no such serious rail wear due to the flange is perceptible. On the other hand, the great advantages of the direct drive would be lost, and as practice has shown that the gears wear extremely well and show an admirably smooth surface after running many thousand miles, it may be a more commercial method to wear out the cheap rail instead of expensive mechanism. At the same time, it must be remembered that it has not been practicable to operate steam trains at the same schedule as is frequently adopted for electric service, and as a consequence there is no information as to how the tracks would have been affected if they had been so operated. These faster schedules are necessarily brought about by

higher acceleration and deceleration than is usual with steam conditions.

The division of the weights of the motive power between a large number of wheels, together with the advantage of the motive power being absolutely in balance, cannot fail to have less damaging effect upon the permanent way, provided that other conditions are equal. In the case of the Liverpool & Southport electric line, the maximum weight per axle, i. e., on a motor car is 25,760 lbs., or with such a vehicle loaded 28,560 lbs. The trailer cars work out to about 16,800 lbs. per axle. In a four-car train, composed of two motors and two trailers, therefore, the rail loads would be eight axles of 28,560 lbs., and eight axles of 16,800 lbs.—fairly well distributed. In the case of steam traction, and taking as an example the heaviest tank engines of the Lancashire & Yorkshire used for suburban work, viz., six-wheeled coupled radial tank engines with 19-in. cylinders, there would be for the engine three driving axles averaging 39,088 lbs. each, and two radial axles, the leading having 23,800 lbs. and the trailing 32,480 lbs., together with the train

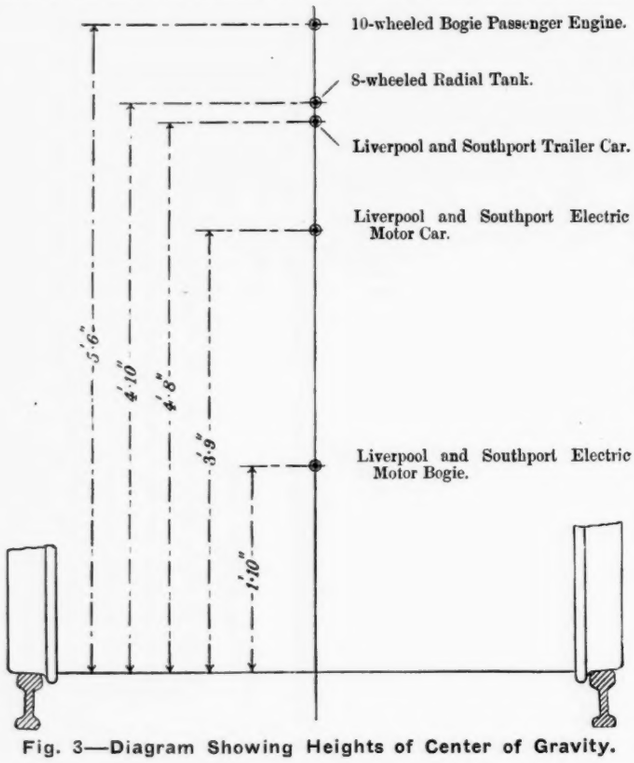


Fig. 3—Diagram Showing Heights of Center of Gravity.

of carriages of similar weights to electric trailers. This engine, however, is not sufficiently powerful to run a regular service to the electric schedule. It will be seen that there must be heavy stresses upon the track, due to the accumulated weight upon the coupled wheels, the rigidity of such coupled wheels, and the lack of balance, which to some extent is bound to be present. Owing to the heavy weights carried, a comparatively small wheel-base is essential for a motor bogie, 8 ft. being about usual. The smaller the wheel-base, the greater will be the amount of "hunting," or sinuous action, the effect of this action being greater or less according to the height of the center of graviy of the motor bogie, and its relative freedom of movement, distinct from the body of the vehicle. The advantage of a comparatively long wheel-base for bogies under certain conditions is admirably dealt with by Professor Carus-Wilson in his paper on the "Predetermination of Train Resistance."* Fig. 3 shows the position of the center of gravity in electric motor cars and locomotives.

CARS.

The construction of the cars, which have to carry large numbers of people, is of considerable importance, and it might seem at first sight as if numerous outlets in the form of doors would prove a remedy for delays at stations. A multiplicity of side doors means that a larger staff has to be employed on the platforms, if they are to be safely closed, or if they are sliding doors worked automatically there is some risk to the public of being caught by them, and there is much greater risk of sliding doors being jammed in case of accident. The system imported from America of having men on each platform between each pair of cars to open the gates and shout the names of stations, leads to an excessive train staff being employed. This multiplication of labor is an economic waste, and the effect on the public is that, having so many people to look after them, they enter and leave the cars in a very leisurely fashion, resulting in too much time being spent at stations. A system of having large side doors at each end of a 60-ft. car, which doors are readily opened or closed by the public themselves, saves the waste of labor, causes the passengers to move quickly in and out of the cars, and has shown in practice in the north of England that the trains may be got away from the stations in less time. The most crowded cars are always emptied during the rush hours in about 50 seconds at terminal stations, while intermediate stops only require 15 seconds to pick up and set down passengers. Stopping trains, with considerable amounts of luggage and parcels to handle, can be worked with two guards and a motorman, while express trains need but two men—a motorman and a guard. The great strength which is obtained by having cars made with end doors only is of much importance, frequent side doors making a very weak structure.

When the Liverpool & Southport line was operated by steam, 30 locomotives and 152 carriages with 5,084 seats were required to do the work, this number including the necessary percentage under repairs. The number of vehicles now required upon this length of 18½ miles is 38 motor cars and 53 trailer cars with 5,814 seats.

I do not give a detailed description of the plant and equipment, because that has already been very fully published in all the technical papers. The special features, however, in connection with the rolling stock on the Liverpool & Southport electric line are:

(*a*) Direct control of electric equipment on cars, as distinguished from multiple unit control, though multiple unit control has been used to a certain extent with some later cars.

(*b*) Adoption of the automatic vacuum brake, which is the brake in use upon the rest of the railway, but with specially added valves for releasing the brakes rapidly after application.

(*c*) Carriages of the exceptional width of 10 feet over all, allowing a considerable area of floor space per passenger.

CONTROLLERS.

No serious attempts were made, previously to 1903, to design a main or direct controller capable of handling the amount of current required for very large trains. In the case of four-car Liverpool & Southport trains, weighing 144 tons, a maximum of 2,400 ampères is required during the period of acceleration. In addition to the main controller, the main switches and circuit breakers and ammeter are placed in the motorman's compartment. The man in charge is, as a consequence, able to realize exactly what is occurring on the train. These large controllers have justified the forethought displayed in their design by the small amount of maintenance required in their upkeep. Examination must obviously be more simple and effective, since the whole of the control equipment for eight 150 h. p. motors is contained in two motormen's compartments, and can be inspected at any time without being put over a pit or under cover from the weather. The credit for this design belongs to the contractors who supplied the equipment.

(To be continued.)

**Proceedings, Institution of Civil Engineers*, Vol. CLXXI., 1907-1908.

THE NEW TEXAS COMMISSIONER.

W. D. Williams, Mayor of Fort Worth, Texas, has been appointed a member of the Railway Commission of Texas. He succeeds Judge L. J. Storey, who died recently. Like the other members of the Texas commission, Mr. Williams has had no railway training and is a lawyer and a politician, but it is understood that he has taken a keen interest in the question of the regulation of railways by the state and is a man, as far as we can judge from reports, who will have rather a more decided opinion on the questions that come before the Commission than did his predecessor, Judge Storey.

W. D. Williams.

While Judge Storey was a member of the Commission, the forces of good and evil were more or less balanced. O. B. Colquitt gave expression to any bit of rabid anti-railway public opinion that seemed to meet his political views. He was a candidate for governor, and is generally believed to still have his eye on that office. The view of him most often expressed by railway men who have had to do with the Texas Railway Commission seems to be that not only did he voice popular prejudice against railways, but that he was not especially sincere in all his expressions of opinion.

Allison Mayfield, who has now been made Chairman, had a reputation for fairness and careful consideration of both sides of the question that made him respected by railway men, whether they agreed with his opinions and decisions or not.

Judge Storey at the time of his death was rather an old man, and, although meaning to be perfectly honest and fair, was inclined to be influenced by whichever fellow commissioner was most insistent, so that he acted as a kind of shifting balance in the work of the commission. It is his place that Mr. Williams has got to fill, but whatever attitude Mr. Williams adopts, it seems unlikely from his past record that it will be so pliant a one as that adopted by Judge Storey. He is more likely to throw himself whole heartedly on the side of fairness or on the side of prejudice.

The Chinese are making sad work with their first experiments in railway building, according to a correspondent of the London *Times*, who has inspected the work on a line from Shanghai southwest to Hang-Chow and thence eastward to Ning-po, being on the two sides of Hang-Chow Bay. A British syndicate advanced the money for the work, with the right to have a British engineer, the work being done by Chinese. But the engineer is not consulted; the Chinese so-called engineers have but the most elementary knowledge of their profession or none at all; all sorts of blunders are made; the materials are apparently the cheapest that could be had, and there are eight different kinds of rolling stock, explained by the fact that there are eight directors, who take turns in giving out contracts. In one place, where there was difficulty in bridging a stream the Chinese built the bridge on dry land and then dug a canal and diverted the waterway under the bridge. Both the entrance to the diversion and the exit from it were at right angles to the natural direction of the stream. The men who advanced the capital are offering their securities at 70 cents on the dollar.

THE COMMODITY CLAUSE HELD CONSTITUTIONAL.

The following is a summary of the opinion in the commodities case:

1. The claim of the government that the provision contained in the Hepburn act approved June 29, 1906, commonly called the commodities clause, prohibits a railway company from moving commodities in interstate commerce because the company has manufactured, mined, or produced them, or owned them in whole or in part, or has had an interest direct or indirect in them, wholly irrespective of the relation or connection of the carrier with the commodities at the time of transportation, is decided to be untenable.

It is also decided that the provision of the commodities clause relating to interest, direct or indirect, does not embrace an interest which the carrier may have in a producing corporation as the result of the ownership by the carrier of stock in such corporation irrespective of the amount of stock which the carrier may own in such corporation, provided the corporation has been organized in good faith.

2. Rejecting the construction placed by the government upon the commodities clause, it is decided that the clause, when all its provisions are harmoniously construed, has solely for its object to prevent carriers engaged in interstate commerce from being associated in interest at the time of transportation with the commodities transported, and therefore the commodities clause only prohibits railway companies engaged in interstate commerce from transporting in such commerce commodities under the following circumstances and conditions: a—When the commodity has been manufactured, mined, or produced by a railway company or under its authority, and at the time of transportation the railway company has not in good faith before the act of transportation parted with its interest in such commodity; b—When the railway company owns the commodity to be transported in whole or in part; c—When the railway company at the time of transportation has an interest direct or indirect in a legal sense in the commodity, which last prohibition does not apply to commodities manufactured, mined, produced, owned, &c., by a corporation because a railway company is a stockholder in such corporation. Such ownership of stock in a producing company by a railway company does not cause it as the owner of the stock to have a legal interest in the commodity manufactured, &c., by the producing corporation.

3. As thus construed the commodities clause is a regulation of commerce within the power of Congress to enact. The contentions elaborately argued for the railway companies that the clause, if applied to pre-existing rights, will operate to take property of railway companies, and therefore violate the due process clause of the fifth amendment, were all based upon the assumption that the clause prohibited and restricted in accordance with the construction which the government gave that clause and for the purpose of enforcing which prohibitions these suits were brought.

As the construction which the government placed upon the act and seeks to enforce is now held to be unsound, and as none of the contentions relied upon are applicable to the act as now constructed, because under such construction the act merely enforces a regulation of commerce by which carriers are compelled to dissociate themselves from the products which they carry, and does not prohibit, where the carrier is not associated with the commodity carried, it follows that the contentions on the subject of the fifth amendment are without merit.

4. The exemption as to timber, contained in the clause is not repugnant to the constitution.

5. The provision as to penalties is separable from the other provisions of the act. As no recovery of penalties was prayed,

no issue concerning them is here presented. It will be time enough to consider whether the right to recover penalties exists when an attempt to collect penalties is made.

6. As the construction now given the act differs so widely from the construction which the government gave to the act, and which it was the purpose of these suits to enforce, it is held that it is not necessary, in reversing and remanding, to direct the character of the decrees which shall be entered, but simply to reverse and remand the case with instructions to enforce and apply the statute as it is now construed.

7. As the Delaware & Hudson Company is engaged as a common carrier by rail in the transportation of coal in the channels of interstate commerce, it is a railway company within the purview of the commodities clause and is subject to the provisions of the clause as they are now construed.

There was but one dissenting opinion. It was by Justice Harlan, and it was very brief. He said: "As those cases are now determined wholly on a construction of the parts of the Hepburn act here in question, and as Congress, if it sees fit, may meet this construction by additional legislation, I content myself simply with an expression of nonconcurrence in some of the views expressed by the court as to the meaning and scope of the act. In my judgment, the act, reasonably and properly construed, according to its language, includes within its prohibitions any railway company transporting articles or commodities if at the time it legally or equitably owns stock—certainly if it so owns a majority or all the stock in the company—that mined, manufactured or produced the articles or commodities being transported by such railway company."

The following outline of the effect of the decision was given by Robert W. De Forest, who, with John G. Johnson, argued the commodity cases before the Supreme Court:

"Practically the decision of the Supreme Court is in favor of the railways and the public, and against the contention of the Attorney General, that all coal mined by the railways, which had a direct ownership in the coal, and that all coal mined by the subsidiary coal companies, in which the railway companies had a stock interest, was barred of interstate transportation by the Hepburn act.

"Of the anthracite carriers only two, the Delaware, Lackawanna & Western and the Delaware & Hudson, have any direct legal ownership in anthracite coal. Both these companies are authorized by their charters to mine anthracite coal and to transport it.

"All the other so-called anthracite carriers, that is, the Reading, the Central of New Jersey, the Pennsylvania, the Lehigh Valley, the Erie and the New York, Ontario & Western, own stock in coal mining companies.

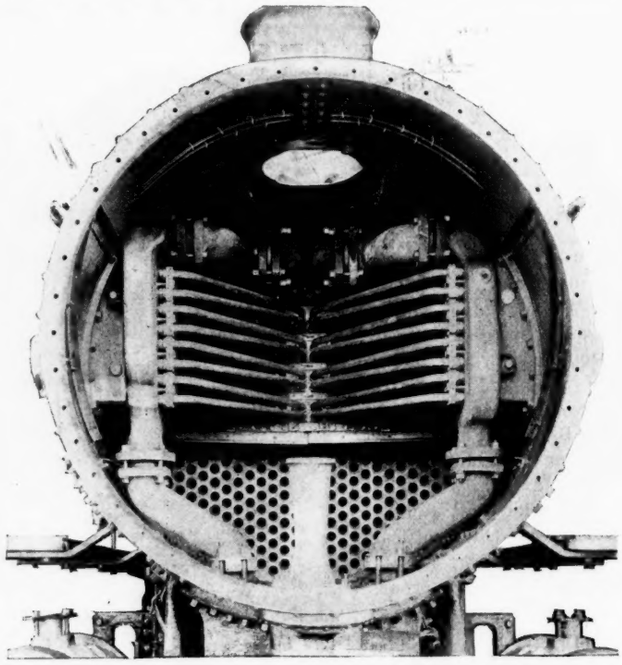
"The decision establishes the legality of anthracite coal transportation by these six last-named companies; that is, the transportation of coal mined by companies in which they have a stock interest. This leaves only the situation of the Delaware, Lackawanna & Western and the Delaware & Hudson to be considered.

"The Delaware & Hudson Company, as I understand, at the present time, and for some time past, has been accustomed to sell its coal at the mines. Therefore, the prohibition of the act, under the decision of the Supreme Court, would not apply to it. It would apply to the Delaware, Lackawanna & Western, under what I understand to be its present course of business, but it would seem quite possible for that company to adopt the practice of the Delaware & Hudson, or equally possible for that company to transfer its coal lands to another company, the stock of which can be held by it, inasmuch as the coal lands are not covered by any mortgage."

The new Austrian Minister of Public Works, Ritt, is an engineer, and the first that has ever occupied a seat in an Austrian cabinet.

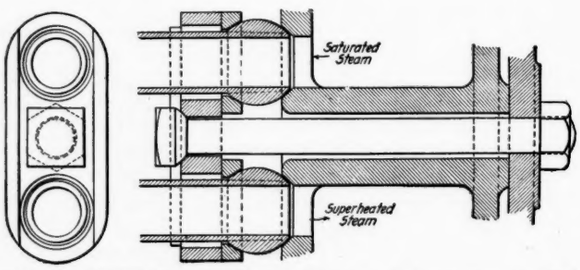
IMPROVED COLE SUPERHEATER.

The Cole superheater for locomotives, as made by the American Locomotive Co., has been modified and improved by certain changes in the arrangement of the headers and superheater tubes. The superheater is of the fire-tube type and was originally designed with enlarged fire-tubes with four



Cole Superheater in Position.

superheater tubes each. Each of these tubes had an inner and an outer tube. The inner one carried the saturated steam to the back end of the superheater tube, where it escaped into the outer tube and was led forward to a header for delivery to the cylinders. With this arrangement, which was illustrated in the *Railroad Gazette* of Sept. 2, 1904, and June 9, 1905, the superheated steam was exposed to the temperature of the pipe containing the saturated steam, so that part of the heat of the superheated steam was used for the superheating. With the new arrangement, this feature has been omitted and all superheater pipes are directly exposed to the hot gases. In the former arrangement, the steam made one passage through the tubes, while now it makes two complete round trips from the smokebox to the back end of the tubes.

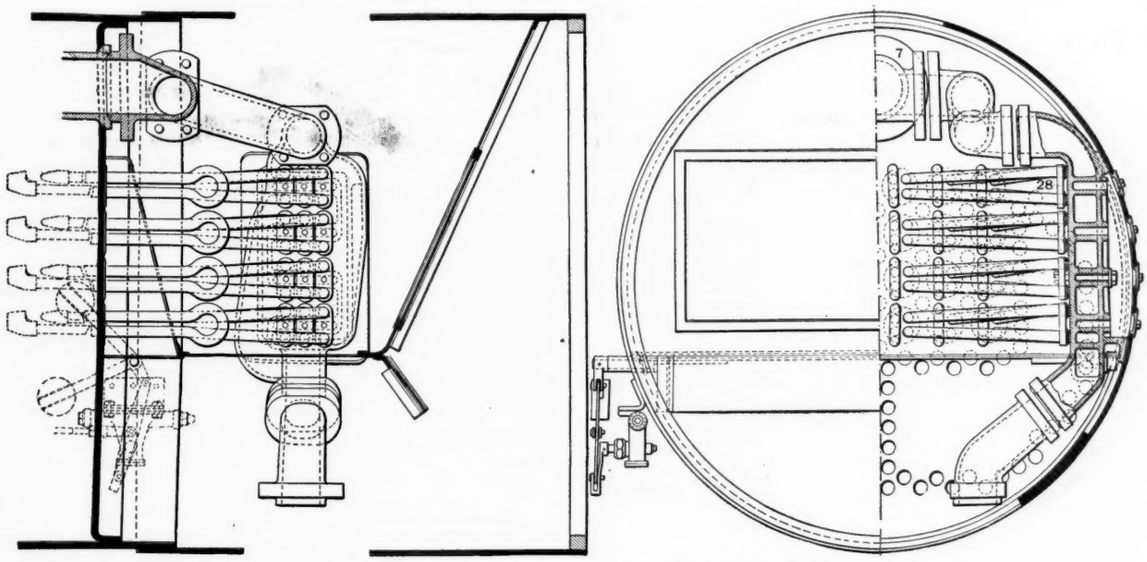


Sectional Elevation of Steam Pipe and Superheater Tube Joint.

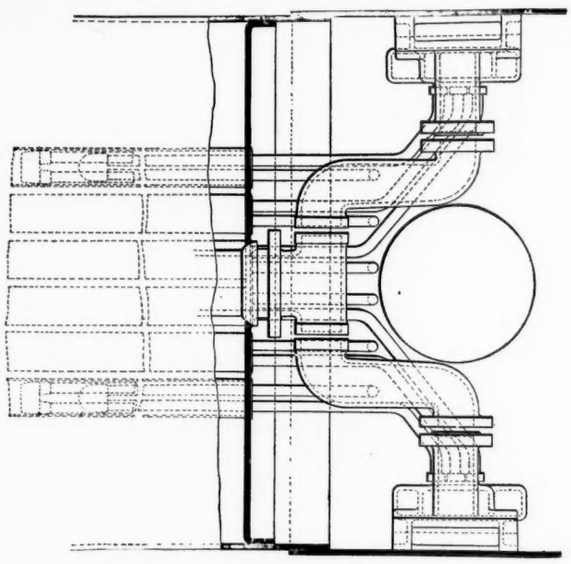
The methods of accomplishing this are clearly shown in the accompanying drawings. In the first place, there is a complete separation of the steam used on the two sides of the locomotive, the same as in an ordinary locomotive without a superheater.

The steam is delivered from the drypipe in the usual manner, and passes through the teehead into headers on either

side. These headers occupy the same position in the smokebox as the ordinary steam pipes, lying close to the shell. The vertical section of the smokebox shows that each header is divided into two chambers, separated by a zig-zag partition running up and down through the center. In one of these chambers, that towards the front of the smokebox, the saturated steam is received from the boiler. The other chamber discharges the superheated steam into the steam passages of the saddle and cylinder. The steam passes from one of these chambers to the other by way of the superheater tubes in the enlarged fire-tubes. At the rear end of the fire-tubes there is a return bend of special construction. The steam after passing this bend goes forward and is turned back by a loop in the pipe located in the smokebox and goes to the rear again to a second return bend and then comes out to the superheated side of the header.



Elevations of Smokebox, Showing Cole Superheater Arrangement.



Plan of Steam and Superheater Pipe Arrangement.

The wide temperature variations, during superheating, not only in the steam and the tubes containing it, but also in the other parts with which these tubes are connected, requires that there should be great flexibility in all connections in order to provide for the expansion and adjustments to relieve the stresses that would otherwise result. The details of the fastening of the superheater tubes to the headers are shown in the accompanying engraving. The header is a hollow casting, with holes cored through the partitions for the bolts that hold the tube caps in place. The header ends of the superheater tubes are ball-jointed to the header openings. With this arrangement, any nest of tubes can be quickly disconnected and withdrawn for inspection or replacement, and sufficient flexibility of connections is provided that expansion stresses are eliminated.

A damper at the foot of the diaphragm and in front of the superheater fire-tubes protects them from the hot gases when the engine is not using steam. This damper is opened and closed automatically as steam is admitted or shut off. Handholes are provided in the side of the smokebox for tightening the tube caps.

ENGLISH RAILWAYS.

BY WILLIAM WICKHAM TURLAY.

The president of one of our most important American railways, on his return from a vacation trip to Europe not long ago, told a newspaper reporter that we had nothing to learn from European railways. Many other American railway men have made similar statements, but not all of them have gone to such an extreme in their expressions. It must be remembered that officers everywhere are, as a class, disposed to be contented with established conditions, and adverse to changes, which are always troublesome, and which do not always bring about improvement. It is possible, also, that our higher railway officers, who usually travel in private cars, or even by special trains, when making journeys of any considerable length, do not fully realize the conditions which the ordinary traveler meets. It may be interesting to make comparisons of our methods with those of other countries, provided we keep an open mind, and are willing to recognize what we find good in foreign practice, as well as in our own.

Our American railways, built in a comparatively undeveloped and thinly populated country, have been compelled to give special attention to the hauling and transportation of freight. They have succeeded so well in this that by the use of extremely powerful locomotives and very large cars, they are able to carry train loads of coarse freight, such as coal, steel and grain, at lower rates than are found in any other country except Canada, and Canada is really not an exception, because its conditions, and the development of its railways, have been almost precisely the same as our own. The remarkable work which has been done in moving an enor-

mous tonnage of coarse freight has attracted the admiration of railway men in other countries, and they have adopted American methods in cases where the local conditions made it possible to do so, especially in some of the British colonies.

Our country has now come to the beginning of the transition period in its history, and in the operation of our railways, as in many other ways, we must adapt ourselves to the changed conditions brought about by an immense growth of population and a rapid development of commerce and manufactures. In our eastern states, at least, more attention must be given to the transportation of passengers, and of small or "less-than-carload" lots of freight. This may result in a large part of the bulky freight being carried on separate tracks built for the purpose, or by water routes, which can be constructed (or old ones improved) in many parts of the country.

We have come to understand quite well that railways and waterways are like public highways, and must be managed primarily for the benefit of the community, although with due regard to the profitable use of capital actually invested in them, and on this basis we shall in future be able to discuss possible or necessary changes with less bitterness and injustice than have attended such discussions in the past, but there will always be found some who will oppose any change, and unfortunately many of our prominent railway men appear to consider freight traffic much more desirable than passenger, and have produced figures to prove that the latter is unprofitable. Without going into tiresome details, it may be said in answer to such statements that they are based on figures which are largely arbitrary, because to a very great extent neither the capital charges nor the operating expenses of a railway can be divided accurately between freight and passenger traffic. For bookkeeping purposes an attempt is made to do this, and at considerable expense, but it is safe to say that fifty expert accountants, if given a free hand, would devise fifty different systems for such a division.

By degrees our railways must adapt themselves to an increased proportion of income from passengers and from *small* shipments of freight. They will meet the problem successfully, as they have met others, and the change will probably be accompanied by increased facilities and reduced rates. As these conditions have prevailed in Europe during the whole period of railway development there, let us study some of the features of English railways, which are perhaps as well managed as any in Europe, though they are not radically different from those on the continent.

British Suburban Station.

PROTECTION FROM ACCIDENTS.

At an English station passengers are not allowed to cross from the construction of the platforms, which are nearly on a level with the floors of the cars, so that a passenger steps easily and quickly into the train through one of the numerous side doors, instead of climbing up a steep and narrow flight of steps. The train moves off without any shock or jar, and if a locomotive or car is coupled to the train at a station this is done without discomfort to the passengers by a method of great simplicity, which, while not automatic, can be operated with little danger to the employees, and insures an easy motion. This coupling being adjusted by hand for each car cannot be operated as quickly as the American automatic coupler, but it obviates the extremely violent concussions incident to the use of the latter. The line of the railways is well protected by block signals, similar to those in use on many of the best American roads; it is well fenced or hedged to keep off human and animal trespassers, and never crossed at grade by other railways, which are always carried over or under it. Highways never cross the track at grade except in a few parts of the country where the ground is very flat, and the crossings are then protected by heavy gates (not mere bars), carrying lights at night, which either completely close the highway, or, when the latter is open, swing across the tracks so that a train cannot pass without running into them. All these safeguards result in making accidents far less numerous than in America, though the orderly habits of the people, and a strict enforcement of laws against trespassing, probably go far towards reducing the number of people killed or injured when crossing or walking along the tracks. The rule of avoiding grade crossings has been followed from the beginning of railway construction in England, and has made the first cost of the lines very high. Such an expense would have been prohibitory when many of our American railways were built, and in thickly settled parts of the country they now find themselves compelled to rebuild their lines at a far greater expense than would have been necessary in the beginning had enough capital then been available.

The walls and fences of English stations are almost always covered over with advertising signs and placards, a considerable income being derived in this way. The stations, usually neat and attractive in every other respect, are thus defaced and made unsightly. Fortunately, only a few American railway companies have yielded to the temptation to increase their income in this questionable manner. The hideous "field-sign" has heretofore been seen as often in England as in America, but the owners of land along the line, and not the railway companies, are responsible for the nuisance. Laws recently enacted will gradually abolish field signs in England during the next few years. Let us hope that public sentiment may soon demand similar legislation in America.

(To be continued.)

General News Section.

At Washington this week the Interstate Commerce Commission gave a hearing on an order, which it proposes to issue, requiring all trains to have all cars equipped with power brakes.

The Oklahoma State Corporation Commission has fined the Atchison, Topeka & Santa Fe $100 for failing to have a warm waiting room one night last November at Tangier. The agent told the complaining passengers that no fire was needed.

The *New York Times* announces that on the night of May 3 communications were sent by wireless telegraph between the Waldorf-Astoria Hotel, in New York, and the Auditorium Annex, in Chicago. The *New York Times* and the *Chicago Tribune* exchanged congratulatory messages.

On the Panama canal works May 1, 11 workmen were killed and nine injured in a runaway of work cars. In the Gold Hill section, by some accident or mismanagement in connection with the air-brakes, a number of dump cars became uncontrollable and ran down a grade, falling into Culebra cut.

At Hauser Junction, near Spokane, Wash., on the night of April 29, a westbound passenger train of the Northern Pacific was stopped by two masked robbers, who compelled the engineman to haul the mail car several miles away from the rest of the train. The reports do not indicate how much property was stolen.

One of the big Mallet articulated compound locomotives which have been built by the Baldwin Locomotive Works for the Southern Pacific, and which were described by the *Railroad Age Gazette* in its issue of April 30, page 933, was on exhibition at the La Salle street station in Chicago this week, and large numbers of persons visited the station to see it.

The special women's cars on the Hudson Tunnel Railway are legal. This is the substance of a letter from the Interstate Commerce Commission to Thomas Dundon, who complained to the Commission that the reservation of cars for women was a violation of the law. The Commission holds that as men are not excluded from the women's cars the law is not infringed. The Commission also sent a copy of its decision to the president of the Hudson & Manhattan railway.

The Governor of New Jersey has appointed Samuel Whinery, of East Orange; Charles Hansel, of Cranford, and Frank Stevens, of Jersey City, commissioners to appraise and revalue the railway and canal property in the State. The appointments were made under authority of a joint resolution passed by the Legislature, the acknowledged purpose of which was to raise the assessments of the railways. Mr. Whinery and Mr. Hansel are well-known engineers and Mr. Stevens is said to be an expert in real estate values.

Boston's Attitude Toward Mr. Billard.

The merger situation in the Massachusetts legislature has reached this status since Governor Draper sent in his message recommending that a special corporation be chartered to hold the stock of the Boston & Maine held by John L. Billard (though that stock was not mentioned by name) and so protect Massachusetts from danger of the Billard stock passing into hostile hands: For some time the railway committee and the Governor were at loggerheads and no progress was made toward the drafting of a bill. The Governor has insisted that the committee come to his position and report a bill to do what he wanted done. But the committee has been equally insistent that the Governor should give them all the facts in the case which were at his command in order that they might act intelligently. So the matter stood till the executive modified his position and now the Attorney-General is preparing a bill which shall embody the Governor's views and so give the railway committee the information desired. Both the merger and the anti-merger men have said that the Governor was on their side as proved by his message. Neither side has yet shown any willingness to retreat. At the hearing by the railway committee on the message the anti-merger men, including leading Boston merchants, were as emphatic as ever against allowing the New Haven and the Boston & Maine roads to come under one management.

Telephone Despatching on Illinois Central.

The Illinois Central is installing telephones for train despatching on the four districts between Chicago and Cairo and East St. Louis. This installation will be completed within the next two weeks, after which the company will put in service as fast as possible telephone circuits on its Tennessee division, between Paducah, Ky., and Memphis, Tenn.; on its Mississippi division, between Memphis, Tenn., and Canton, Miss., and between Water Valley, Miss., and Grenada; and on its Louisville division, between Louisville, Ky., and Paducah. The wires and instruments are already up on the districts on the Tennessee, Mississippi and Louisville divisions, so that all that remains to be done before adopting telephone despatching there is to instruct the men.

This despatching scheme does not contemplate any reduction in the forces or wages of telegraph operators employed, but it is likely that the installation of the train despatching circuits will be followed by the installation of telephone message circuits for moderate distances.

Progress of the Denver, Northwestern & Pacific.

A letter from D. H. Moffat, President of the Denver, Northwestern & Pacific, to the bankers who have recently bought notes of the Colorado-Utah Construction Co. describes the notes and the property and progress of the Denver, Northwestern & Pacific as follows:

"Confirming the sale to you of $4,000,000 of two-year 6 per cent. collateral trust coupon notes of the Colorado-Utah Construction Co., would say that these notes will be dated May 1, 1909, and secured by deposit with the trustee of $8,000,000 par value of first mortgage 4 per cent. bonds of the Denver, Northwestern & Pacific. The notes will bear the personal endorsement of D. H. Moffat.

"The Denver, Northwestern & Pacific has now been completed between Denver and Steamboat Springs, a distance of 210 miles. The total amount of first mortgage bonds issued against this 210 miles is $10,900,000, being the maximum amount which, under the terms of the mortgage, can be issued against this mileage. The actual cash invested in the construction and equipment of the present line is approximately $12,800,000. The first mortgage bonds, therefore, represent some $2,000,000 less than actual cash cost. The railway company had no indebtedness except the $10,900,000 of bonds above referred to.

"The Colorado-Utah Construction Co. has a cash paid-in capital of $2,000,000. This construction company was organized to build and equip the Denver, Northwestern & Pacific, receiving in payment $40,000 bonds and $40,000 of capital stock for each mile built, equipped and put in operation, with an additional issue of $2,500,000 of first mortgage bonds and $2,500,000 of capital stock to cover the extraordinary expense of constructing the railway across the continental divide, which difficult undertaking has now been accomplished. The $4,000,000 of notes sold you covers the entire indebtedness of the Colorado-Utah Construction Co. aside from what it owes to D. H. Moffat individually, approximately $5,000,000.

"Through the ownership of all the capital stock of the Northwestern Terminal Railway Co., the Denver, Northwestern & Pacific has valuable terminals in the business portion of Denver, near the Union depot.

"The road is laid with 80-lb. rails, and is thoroughly rock-ballasted; equipment, paid for in cash, engines of highest type, built by the American Locomotive Works; freight and passenger cars constructed by the Pullman Company. With the completion of the road to Steamboat Springs practically

all the difficult features of the entire enterprise have been overcome, and earning power of greatly in excess of fixed charges can be demonstrated, even if no extension whatever should be undertaken.

"At Steamboat Springs the road will control important and increasing shipments of cattle, lumber, agricultural products, minerals, coal and other traffic from a very extensive and resourceful territory now without any other line of road built or projected. The Oak Hills Coal Mines, from which the road is now getting engine fuel, are reached some 18 miles east of Steamboat Springs; at these mines three entries have already been made, each more than 600 ft., upon a vein 9 ft. thick of high-grade bituminous coal, and the erection of hoisting and coal-mining machinery preparatory shipments of from 1,000 to 2,000 tons of coal per day to the Denver market is practically completed. In these mines and equipment Denver capitalists have already invested over $400,000. According to the United States geological reports those coal fields contain 1,200 square miles of high-grade bituminous and anthracite coal.

Estimate of Earnings from Present 210 Miles of Road for 12 Months Ending May 1, 1910

Gross earnings	$2,100,000	Int on $10,900,000 1st 4s.	$436,000
Net earnings (40%)...	840,000	Balance, surplus	404,000

"The actual cash earnings of the uncompleted road for the first five months and one week of the current fiscal year, beginning July 1, 1908, were $385,960. The road did not reach the coal fields or Steamboat Springs until January, 1909. These earnings were, therefore, derived chiefly from passenger, lumber and cattle traffic, without any business from the coal mines, Steamboat Springs or territory tributary thereto, which from now on it will have."

Railway Supply Men Oppose Railway Legislation in Illinois.

A delegation of about 100 of the higher officers of railway supply manufacturing concerns having plants in Illinois visited the state capital, Springfield, on April 29, to oppose the passage of any laws affecting railways at the present session of the legislature. The demonstration was under the auspices of the Railway Business Association and the plans were made chiefly by A. H. Mulliken, of Pettibone, Mulliken & Co., Chicago, a Vice-President of the Railway Business Association. The delegation was composed almost entirely of the presidents or vice-presidents of the supply manufacturing concerns represented. A special train of 11 compartment cars took about 75 members of the delegation from Chicago to Springfield on Wednesday night. It probably was the only train of equal length composed entirely of compartment cars that ever was run out of Chicago. The party from Chicago was joined in Springfield by about 25 officers of supply manufacturing concerns in other parts of the state, principally in East St. Louis.

At 9 o'clock a.m. on Thursday the entire party set out in a body from the St. Nicholas Hotel and marched to the state house. It was the original plan that the supply men should be given a hearing only by the committees of the legislature to which railway bills had been referred, but Speaker Shurtleff, of the House of Representatives, was so favorably impressed both with the delegation and its purpose that he accepted a suggestion that the two houses of the legislature be convened in joint session to hear what the spokesmen had to say. The members of the Senate were therefore invited and came over in a body to the House of Representatives chamber, where they were addressed by Mr. Mulliken and George A. Post, of the Standard Coupler Co., New York, President of the Association. Mr. Mulliken spoke very briefly, and closed by introducing Mr. Post. Mr. Mulliken said in part:

"Within the past year, in a most striking manner, we have had our attention called to the waste and neglect of our natural resources, the wanton destruction of our forests, the wasteful methods of production in our mines and the neglect of the natural sources of water power. There is, however, a waste and a destruction going on that causes greater loss to every individual and to the country than all other wastes combined. It is the waste and loss caused by class prejudice in business and antagonism between business interests, and the disposition of the government to harass industries instead of fostering them. This spirit of prejudice has caused and is causing the greatest possible financial loss to our people.

"It is time to make a change, a change in our ideas, a change in our common policy, a movement toward co-operation and conciliation between all the large business interests by which we work together for the good of all and by so doing we benefit all.

"It is this idea that has brought together a number of men in the railway supply business, who have organized the Railway Business Association to conserve their interests and those of their workmen. They recognize the truth of the statement that self-interest is the strongest interest. But they wish to educate that interest, so that it will be intelligent and enlightened, and so that it may bring about not only the greatest immediate results but continued prosperity. They believe that the spirit of conciliation and co-operation should be a national policy, that upon that platform all should unite, and all can stand, and it is with that idea that we are here to urge upon you a fair consideration of the business interests of the state and of the railway supply interest in particular, its employers and employees.

"We are not here to represent the railways, but when the railways are prevented from buying from us by agitation and unwise laws, we are compelled to shut down our works and discharge our men."

The following are extracts from the speech of Mr. Post:

"As business men and large employers of labor we are suitors for your attention at this moment. We have come to you to appeal for your consideration of our necessities. We have suffered tremendously during the past 18 months because of the inability of railways to buy the commodities that we are organized and equipped to produce. Our industries are but slowly recovering from prostration, and they stand in need of most careful nursing to restore their normal health. Those who are engaged in manufacturing material and equipment for railways have not enjoyed the re-employment which has come to some other lines of business.

"Those to whom railways must look for funds wherewith to carry on plans for construction, for the purchase of rolling stock and other betterments, are slow to open their purses for railway investment. After such a deluge of legislative enactments as have, in the recent past, flooded the statute books of many states, they view with apprehension the torrent of bills in the legislatures, and while they wait for the flood to subside our industries languish and our men are without work.

"The industrial and commercial interest in behalf of which we speak is the largest in the country. The industries, from raw material to finished product, having railways for their sole or largest customers, employed before the depression 1,500,000 men. In addition to the 1,500,000 men employed in these industries, there were in 1907 another 1,500,000 employed by railways themselves. This comes to about 3,000,000 men, a large percentage of whom have lost the whole or a part of their wages during the period of dreadful disaster that has so long affected railways and their allied interests.

"Of this great army no other state has so many as Illinois. The reason is of course that the position of the state as a center and grand junction of the principal trunk lines, east, south and west, has concentrated the cognate activities here.

"It would be impossible to enumerate the kinds of goods made in Illinois which are consumed in great quantities by railways. In Chicago alone there are some 50 or 60 great factories; in Illinois, outside of Chicago, about 70 or 80 more. In downtown offices in Chicago may be found many thousand clerks, accountants, salesmen, administrative officers, draftsmen, engineers.

"Of the men in these industries, probably numbering upward of 200,000, we assume from our own information and from recent figures published by President Gompers, of the American Federation of Labor, that fully half are out of work altogether at the present time, while thousands more are on part time and declare they cannot live on present earnings.

"The Railway Business Association has no connection with railways, other than as purveyors of wares essential to their operation. We are business men, formed into an association, not to do the bidding of railways, but because we have found that our business has been paralyzed by conditions having their base largely in public hostility to them. We seek by

every honorable means within our power to bring about a better understanding between the public and the railways. We want to aid in establishing a profitable and permanent peace, and to put an end to contentions whose fierce fires cause widespread devastation and array brother against brother in strident strife.

"Because we want railways to prosper, and frankly say so, our utterances should not be attainted.

"The very great interest engaged in supplying the railways, perhaps because it did not appreciate its own strength and perhaps, also, because it feared to be criticised or misunderstood if it spoke on behalf of its customer, the railway, has not, until recently, sought to make contributions to the public discussions of those questions. That attitude has now been abandoned. Assured of their strength, convinced that no other motive can reasonably be imputed in face of the palpable one of desiring to put idle men back to work, the railway supply manufacturers and dealers have determined to use what influence they possess to substitute calm deliberation for angry invective, conference for agitation, to the end that public action may be inspired by a desire to foster railways, not to injure them.

"It is our hope, and has been part of our plan of work, to bring home to every employee in all our establishments the fact that to attack the railway is to attack him. The relation between the apprehensive investor and the unemployed workingman has not been sufficiently clear to the workingman. We have, however, abundant and convincing evidence that he is coming to understand the necessity to him of railway prosperity and to desire that whoever represents him as a legislator, while properly pledged to favor the regulation of the public service corporations in the public interest, should give careful consideration and investigation to proposed restrictions.

"It is not the purpose of the Railway Business Association to cry aloud that railways should be let alone by the federal and state authorities. They must be regulated. The interests of the public inexorably demand it, and, indeed, the very well-being of the railways themselves requires it.

"Story, the great jurist, uttered a profound truth when he said: 'That which the law *protects*, it has the right to regulate.' The public has asserted its right to regulate railways, and there will be no backward step. The only question that is debatable now, or ever will be in the future upon that score, will be what attempts at regulation are unwise and what are wise. Upon such questions there will naturally be differences of opinion. Sometimes so-called regulation will be simply an attempt at retaliation by angered persons or interests; sometimes it will represent purely theoretical ideas, sought to be enacted into law, at the instance of those who dream dreams, but who know naught of railway problems; sometimes personal political ambition will animate candidates to pledge themselves to enforce expenditures by railways, on the theory that giving away what isn't theirs looks generous and doesn't cost them anything; sometimes, yes, many times, for the correction of faults, for the better protection of the public, or for their convenience, the stern mandate of the law will, of necessity and of right, be resorted to.

"The mission that brings this delegation of manufacturers to wait upon you to-day is not one of cajolery or bullying. Rather would we help you by a calm resumé of a situation that finds us in distress. We do not say or believe that our lack of business, or the suffering of our men through lack of employment is chargeable to you for sins of omission or commission. But we do believe that the slow pace at which our business is returning to normal is due in large part to the fact that those charged with financing and carrying out projects for the construction and improvement of railways, fear that future enactments will be drastic and hesitate to embark upon enterprises until they can know what conditions of operation they must face.

"There are pending before this body a large number of bills affecting the operations of the railways within the state of Illinois. I shall not enumerate them, nor shall I discuss or analyze their provisions. We do not care to enter into detailed objections to particular measures now before you. We do not assert with regard to any of them that it is essentially bad and ought never to be enacted; but, whatever these bills are, you will do more for the improvement of transportation facilities, more for the shippers of Illinois, more for the thousands of idle men now walking the streets, if you shall subject each one of them to this crucial test:

"Is it certain, beyond a reasonable doubt, that the enactment of this bill, at this time, will not tend to delay still further the re-employment of men now idle?

"Subjected to this test, I believe your only possible deduction will be that every one of them can wait without harm to the people. In the existing situation the one safe rule to adopt regarding legislation is: When in doubt, do nothing.

"This is no time for experiments. An army of workmen want work. If by any possibility the passage of a batch of bills for this, that or another purpose, may cause the man with money to refuse to make investment, because he thinks it of doubtful safety, then, in Heaven's name, let us halt. What is of any importance just now comparable with the restoration of confidence in the minds of men who can give men jobs? Imbue them with confidence and furnace fires will be lighted, whistles will blow calling workmen from idleness to remunerative labor, tradesmen will have customers and the industrial world will be aglow with joy.

"Workingmen made merry by the clinking of coin in their jeans will not miss a few bills from the legislative record. They would rather have food than statutes. A stuffed law file has no such charm for them as a full dinner pail.

"In closing, I should like to impress upon your minds indelibly that the Railway Business Association is just as eager for fair play *by* the railways as *to* them. We cannot hope for jug-handled moderation or conciliation. We do not ask it; we do not want it.

"Within the breast of every manufacturer who is here present there are embedded twin hopes as to the results that shall come from the efforts of the Railway Business Association. They are: One, that every man who holds in his hands the sceptre of law-making, law-construing or law-enforcing power over our railways, may in his every act be attuned to moderation and guided by a serene desire to show wisdom in the exercise of power. The other, that every railway officer shall have as his paramount desire and untiring purpose to conduct our railways so wisely, fairly and courteously that the ardor of legislators shall hereafter find its greatest delight in enactments for their encouragement and expansion."

After Mr. Post concluded his speech, which was received apparently with great favor by the legislators, Senator Gardner, of La Salle county, arose and asked him what legislation had been passed in Illinois that had hurt the railways or supply men, or what measures were pending whose passage would hurt them. Mr. Post replied that, as a citizen of New York, it would be unbecoming in him to criticize any act either that the legislature of Illinois had passed or that it contemplated passing. Mr. Gardner then asked Mr. Post what would be the effect on the supply manufacturers of legislation to compel the railways to electrify their terminals in Chicago. Mr. Post replied that the supply men made a great many different articles and that therefore their interests were very diverse. Such legislation as Senator Gardner referred to might be beneficial to some supply interests, but, by compelling the expenditure of a large sum of money for a certain class of supplies, it might be injurious to other supply manufacturers, the demand for whose goods would be actually reduced by this enforced application of a large sum of money to a specific purpose. He said that before the legislature required the roads to spend a large sum for any specific purpose they should be sure what the condition of the railways' treasuries was.

After the hearing before the legislature the supply men's delegation went to the executive office and called on Governor Deneen. Mr. Post made a short talk, telling the Governor of the purpose of the visit to Springfield, and the Governor replied, stating both his attitude and what he understood to be the attitude of the lawmakers toward railway regulation. He cited a number of instances where one interest in the state had sought legislation that might be injurious to some other interest, and where, through the efforts of the state administration, the two antagonistic interests had been induced to confer and agree upon measures that would be beneficial to both and as little injurious as possible to either.

He said that he thought a similar course should be taken in the handling of legislation affecting railways. Representatives of employees, of shippers, of the supply men and of the railways, should get together and try to agree among themselves as to what regulatory legislation should be passed, and he was sure that if they did so the legislature would act upon their suggestion. He said it was perfectly right for the railways to have lobbyists at Springfield to keep their officers informed about pending legislation, but he criticised the officers of the roads for not coming themselves to Springfield and aiding, by the presentation of facts and by offering sound suggestions, in the work of framing fair and proper legislation. He thought that if railway managers had adopted this policy instead of following that of sending legislative agents who could do nothing but oppose all proposed legislation, there would be much less ground for just complaint about the kind of legislation passed.

The supply men were very well satisfied with the results of their demonstration. It is believed that this is the first occasion on which a joint session of a state legislature was ever convened to hear the views of a similar body of men. On the return trip to Chicago William E. Clow made a brief address thanking Mr. Mulliken and Mr. Post on behalf of the supply men for what they had done in planning the demonstration and making it a success.

Carnegie Medals for Heroism.

In a list of awards announced May 3 by the Carnegie Hero Fund Commission the names of two Baltimore & Ohio enginemen appear. Pierce D. Marsh, of Weston, W. Va., gets a silver medal and $1,000 to pay a mortgage, for preventing a possible wreck. He backed a passenger train, of which he was engineman, away from a freight train which had broken loose at the top of a grade. John Carruthers, of West Newton, Pa., gets a bronze medal and $1,000 to be applied to the purchase of a home. Carruthers saw a boy of two years crawling across the track in front of his train. Leaving the engine in charge of his fireman, he went through his cab window and to the pilot, where he seized the boy.

Hine Operating Department Organization.

Major Hine's scheme of railway organization, heretofore referred to in these columns, has been adopted on the Southern Pacific Lines in Mexico, including the Cananea, Yaqui River & Pacific and the Sonora Railway. On the Sonora division, which consists of all operated lines north of Empalme, the officers affected are N. E. Bailey, heretofore trainmaster; G. W. Megrew, heretofore resident engineer; J. E. McLean, heretofore master mechanic; G. A. Stoddard, heretofore traveling engineer. Each will now be assistant superintendent. The superintendent is H. J. Temple, office at Nogales, Sonora. Each continues charged with the responsibilities heretofore devolving upon him, and in addition assumes such other duties as may from time to time be assigned. Those who are located in the same building have one consolidated office file in common with the superintendent. The superintendent's order says: "All communications on the company's business, originating on this division, intended for the superintendent, or for any assistant superintendent, should be addressed simply, 'Assistant Superintendent' (telegrams 'A. S.'), no name being used unless the communication is intended to be personal rather than official, in which case it will be held unopened for the person addressed. An assistant superintendent will always be on duty in charge of the division headquarters offices during office hours. Each officer transacts business in his own name. Cars are to be handled by the chief despatcher. Train orders are given over the initials of the train despatcher on duty."

The superintendent of the Sinaloa division is F. W. Salter, with office at Guaymas, Sonora. On that division the assistant superintendents are: E. N. Brown, heretofore trainmaster; Thos. Hind, heretofore resident engineer; J. Q. Kiler, heretofore master mechanic; Z. S. Milledge, heretofore trainmaster; Jas. Valentine, heretofore traveling engineer. The regulations are the same as on the Sonora division.

The system has also been adopted on the Texas & New Orleans and to the Galveston division of the Galveston, Harrisburg & San Antonio. Assistant Superintendents with their former titles, are: F. B. Irvine, Assistant Superintendent; C. A. Thanheiser, Resident Engineer; W. S. Cox, Master Mechanic; H. J. Micksch, Trainmaster; F. Wessell, Traveling Engineer.

Proposed British Railway Union Abandoned.

The promoters of the bill for a working union of three important English railways, the Great Northern, the Great Central and the Great Eastern, under one management, have decided not to proceed further with the measure. This decision is no surprise in view of opinions previously expressed on behalf of individual members of the proposed partnership. The promoters had satisfied the Board of Trade by substantial concessions, but this was not sufficient for the numerous anti-railway irreconcilables in the present House of Commons, who persuaded the House to allow the second reading only on condition that the committee which was to investigate the bill should be enlarged to 15 members (instead of the usual five) and that every interest which imagined it had a grievance should have a separate hearing. The wording of the instruction would also have enabled the committee to conduct a sort of roving inquiry into the general principles of railway amalgamation; all, of course, at the expense of the promoters. In addition to these clamorous interests, the promoters would also have had to face the determined opposition of the Midland, the North Eastern and other railways whose position might have been affected by the bill. By withdrawing the bill before it reached the committee stage the promoters have undoubtedly saved themselves a long and expensive inquiry. Even if the bill had passed it would probably have been so overweighted with "protective" clauses as to make it not worth having. Without it the three companies will be able to make further arrangements among themselves for more efficient and economical working on much the same lines as the London & North Western and Midland Railways have already adopted. Indeed, something of the kind has already been effected without the help of Parliament.

Brown's Discipline on the Burlington.

Daniel Willard, Second Vice-President of the Chicago Burlington & Quincy, has issued an order that, beginning May 1, the practice of suspending from the service employees in the train and engine department because of infraction of the rules, or for other causes, shall be discontinued. Mr. Willard outlines, as follows, the practice to be pursued in future in administrating discipline on this road:

"A complete and accurate service history of all employees affected by this order will be kept in the office of each division superintendent, and also in the office of the superintendent of the employment department.

"No entry will be made a part of the record of any man until the case has been fully investigated, and the employee affected will, if desired, be given personal hearing in that connection. Whenever a record entry is made, the man affected will be given in writing an exact copy of such entry.

"Any employee found guilty of disloyalty to the company, of insubordination, or drunkenness, will be dismissed from the service, and will not be re-employed. An employee whose service record clearly indicates that he is not a safe or fit man to retain in the service will be dismissed.

"Promotion will in the future, as in the past, depend upon the service record of the man involved, and upon his fitness for increased responsibilities. When these are equal as between two men, the one older in the service will be given preference.

"An employee, upon his request in writing, will at any time be given a copy of his service record.

"Officers directly in charge of men affected by this order are especially requested to report for entry all commendable actions on the part of such employees, as well as those actions which may justify criticism or reprimand.

"The purpose of this order is to assure constant and permanent employment to those employees whose service records indicate their fitness for the positions held, or for increased responsibilities."

British Railway Accidents in 1908.

The railways of Great Britain have again gone through a whole year without having to report the death of a single passenger in a train accident. The total casualties as reported in the Board of Trade tables for 1908 are, as shown in the table below, 1,043 killed and 7,984 injured. It should be noted that this does not include accidents in which the movement of railway vehicles was not concerned. Adding to the table the accidents in this class, the totals would be as follows: Passengers killed 107, injured 3,388; employees killed 432, injured 24,181; other persons killed 589, injured 916; total passengers, employees and others killed from all causes 1,128 and injured 28,485. The other year in which no passenger was killed in a train accident was 1901. In 1905 the number was 39; in 1906 it was 58; excluding these two years, the average number of passengers killed in train accidents yearly during the last 19 years (1890-1908 inclusive) was 12.65. And the average was low for many years previous to that if we except the Tay bridge disaster in 1879 and the Armagh disaster in 1889.

	1908		1907	
	Killed.	Injured.	Killed.	Injured.
Passengers, in train accidents	.....	283	18	534
Passengers, other causes	102	2,242	102	2,132
Employees, in train accidents	6	164	13	236
Employees, other causes	376	4,976	441	5,577
Other persons, in train accidents	...	7	5	11
Do., at highway crossings	51	44	50	30
Do., trespassing	479	118	447	133
Do., at stations, etc.	29	150	41	158
Total	1,043	7,984	1,117	8,811

Pennsylvania Electric Locomotives.

The Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., has received orders for 24 electric locomotives for service in the New York terminal of the Pennsylvania Railroad. The construction of two of these locomotives will be pushed ahead at once in order to have them available as soon as possible. Each locomotive is a double unit, being articulated and consisting of two engines permanently coupled together. The wheel arrangement of the complete machine is 4-4-4-4, there being leading and trailing bogie trucks. The engines will be larger and more powerful than any electric locomotives heretofore built, each having a capacity of something like 4,000 h.p. The design is the result of long study by a committee of Pennsylvania officers consisting of George Gibbs, chairman; A. W. Gibbs, A. S. Vogt and D. F. Crawford.

Medal for James Gayley.

James Gayley, until recently first vice-president of the United States Steel Corporation, has received the Elliott Cresson medal of the Franklin Institute, Philadelphia, in recognition of his invention of the dry air blast process, which has simplified and improved the manufacture of steel and iron.

American Society of Civil Engineers.

At the meeting held on May 5 two papers were presented for discussion, as follows: A System of Cost Keeping, by Myron S. Falk, Assoc. M. Am. Soc. C. E., and The Design of Elevated Tanks and Stand-Pipes, by C. W. Birch-Nord, Assoc. M. Am. Soc. C. E. These papers were printed in the March number of Proceedings.

Railway Telegraph Superintendents.

The annual convention of this association will be held at the Hotel Pontchartrain, Detroit, Mich., June 23, 24 and 25. The following papers are expected: J. G. Jennings (C., R. I. & P.), "The Necessity of Censoring Railroad Telegrams"; H. D. Teed (St. L. & S. F.), "The Difference Between the Trouble Shooter and a Division Lineman"; S. L. Van Akin (N. Y. C. & H. R.), "The Advantages and Disadvantages of Using Cable in Bringing Telephone and Telegraph Wires into Local Offices"; E. H. Millington (M. C.), "Efficient Office Organization"; J. C. Kelsey, "Telephone Construction"; E. J. Little (G. N.), "Benefits of Standards in Telegraph and Telephone Construction"; F. H. Loveridge, "Dry Batteries"; William Maver, Jr., "Wireless Telegraphy"; V. T. Kissinger (C., B. & Q.), "Wire Testing." The Secretary of the association is P. W. Drew, of the Chicago division of the Minneapolis, St. Paul & Sault Ste. Marie.

Association of Railway Claim Agents.

The next meeting will be held at the Hotel Cadillac, Detroit, Mich., on May 26, 27 and 28.

Society of Railway Financial Officers.

The annual meeting will be held at Ft. William Henry, Lake George, N. Y., September 7 and 8, 1909. C. Norquist, Chicago, is Secretary.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; May 11-14, 1909; Richmond, Va.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; May 11; St. Louis, Mo.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York, May 19, 1909; New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.

AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago.

AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—R. E. Wilson, Ry. Exchange, Chicago; May 11; Cincinnati, Ohio.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 16-18, 1909; Atlantic City.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St.; N. Y.; 1st and 3d Wed., except July and August; New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; annual, Dec. 7-10; New York.

AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York; Oct. 18-22; Denver, Colo.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May 26-28, 1909; Detroit, Mich.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago, June 23-25, 1909; Detroit.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York; June 22-23; Montreal.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; June 16, 1909; Old Point Comfort, Va.

INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago, June 21-23, 1909; Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—E. C. Cook, Royal Insurance Bldg., Chicago; June 1-5; Chicago.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 21-23, 1909; Atlantic City.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug., and Sept.; Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.

NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, Aug.; St. Paul and Minn

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; June 8, New York.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C., Collinwood, Ohio; May 17-19; Chicago.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Nov., 1909; Washington.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago; Sept. 7-8; Fort William Henry, Lake George, N. Y.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.

SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R.R, East Buffalo, N. Y.; September, 1909; Denver.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, 199 Chestnut St., Winnipeg; 2d Mon., ex. June, July and Aug.; Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago, 1st Wednesday, except July and August; Chicago.

Traffic News.

The Omaha Commercial Club now has a traffic bureau. E. J. McVann, for many years secretary of the Omaha Grain Exchange, is manager.

James D. Walthall, Assistant Attorney General of Texas, has prepared an opinion for the State Railroad Commission, holding that railways are not permitted, under the Texas anti-pass law, to issue free transportation to the employees of contractors who make uniforms for railway employees.

It is announced that the Rock Island-Frisco lines have entered into an arrangement for making through freight rates and routes in conjunction with the Illinois Traction System, an electric railway that is now operating almost 500 miles of line, most of which is in Illinois. The tariffs cover all articles in the Illinois Classification of freight, and each of the lines that are parties to the arrangement will deliver to and receive from the others any freight destined to and from all its stations.

Testifying before F. M. Dickson, Master in Chancery at Minneapolis, Minn., on April 28, in the Northwestern Lumber Rate case, Howard Elliott, President of the Northern Pacific, said that, based on the actual value of the road, the Northern Pacific is undercapitalized. W. L. Darling, Chief Engineer, had prepared a statement showing that the road had a gross value of $672,000,000. Mr. Elliott concurred in this estimate. W. G. Johnson, Assistant Comptroller, testified that the capitalization as of March 31, 1909, was $439,219,210.

The commercial interests of St. Joseph and Kansas City have presented formal protests to the Missouri Railroad Commission against its proposed schedule of commodity rates. As already stated by the *Railroad Age Gazette*, this schedule was to take the place of the commodity rates fixed by the state commodity rate law, which the federal court recently held unconstitutional. The Kansas City and St. Joseph commercial interests claimed that the proposed rates would be discriminatory against them, as in favor of shippers at St. Louis.

The movement of passenger traffic to the Pacific coast on the low rate colonists' tickets which have been on sale for 60 days has been very large. The Chicago & North Western has had to add a large number of Pullman tourist sleeping cars to its regular equipment for the accommodation of this business, and about 100 Pullman standard and tourist sleeping cars will be in service on this line alone between Chicago and the coast for some time to come to carry transcontinental passengers. Other roads are also enjoying a large increase in this class of business.

The Erie & Western Transportation Company, controlled by the Pennsylvania Railroad and operating the Anchor Line on the Great Lakes, has ordered a 5,000-ton steel package freight steamer, to be called the "Conemaugh." She will be a sister ship of the "Wissahickon," which was put in service in August, 1907. The "Conemaugh" will be 372 ft. long, with a hold 30 ft. deep. She will be equipped with engines that will give her a speed of 13 miles an hour when loaded. She will be ready for service in August of this year, at which time the Anchor Line will have a fleet of 14 steel and iron vessels, with an aggregate capacity of 46,750 tons.

The lines belonging to the Central Passenger Association have decided to make special round trip rates to the eastern summer resorts, such as Atlantic City, Bar Harbor, etc., which will be on a basis of about $25 for the round trip from Chicago. An effort was made to prevent the low rate from being applied to New York, but the differential roads have announced a rate of $25.50 for the round trip from Chicago to New York during June, and the Michigan Central a rate of $26.85. The rate by the "standard" lines will be $28.20. The rates to the Atlantic coast summer resorts will be effective from June 1 to September 30. These rates are made mainly to meet the competition of the summer resorts west of Chicago. The western lines have been making low rates each summer to the resorts in Colorado and other parts of the West.

Counsel for the railways and counsel for the state in the litigation involving the validity of the freight and passenger rates fixed in Arkansas by the State Commission and the Legislature, have agreed upon a tentative plan for terminating this litigation. The plan has been submitted to the Governor and by him to the state legislature. Its main features are: (1) Freight rates fixed by the federal court, which are adapted to yield about 33⅓ per cent. more revenue than the rates fixed by the State Commission, to be given a trial for a year; (2) the railways to move for a dissolution of the injunction issued by the federal court restraining the state from enforcing the rates fixed by public authority the roads to be without liability on their bonds unless the suits are subsequently reinstated; (3) the roads to keep and furnish to the Commission separate accounts and detailed reports of their intrastate traffic, and open their books to inspection by the Commission and its representatives; (4) the Commission to be at liberty to correct any inequalities in rates and make changes to meet changes in conditions, but not so as to reduce materially the road's revenues; (5) the railways to reduce their passenger rates to 2½ cents a mile on roads over 85 miles long; (6) at the end of a year either party to be at liberty to reinstate the suits and proceed with the litigation.

Acting on the suggestion made by the Interstate Commerce Commission, in its decision in the Spokane rate case, the traffic officers of the Harriman and Hill roads are trying to work out a comprehensive revision of the freight rates which they apply to points intermediate between St. Paul and the Missouri river and the Pacific coast. After these roads have worked out a plan it will have to be submitted to all other interested and affected roads for approval. Should it meet with their approval it will have finally to be submitted to the Interstate Commerce Commission for its approbation. J. C. Stubbs, Traffic Director of the Harriman Lines, says that this is the most difficult task that these roads have ever undertaken. It is hoped to work out a scheme of rates not only to Spokane, but to points throughout the West, that will prove acceptable to the Commission. This will necessitate many material reductions, but the railway officers are making an honest effort to comply with what seems to be public desire and the wish of the Commission. They are willing to make some sacrifices to accomplish this end, but whether they will be able to do so satisfactorily remains to be seen. Each intermediate point, such as Spokane, Seattle, Reno, Denver, etc., wants the railways or the Commission to build a fence around a large area and dedicate it exclusively to the jobbing interests of that city. Be the rate problem worked out never so fairly, say the railway officers, it will be impossible probably to please all of the contending commercial centers. For this reason it may eventually be necessary for the strong hand of the Commission to declare that certain rates are just and reasonable per se, and must, therefore, be accepted by both the railways and the shipping communities of the West.

INTERSTATE COMMERCE COMMISSION.

Speculative Damages.

Allender et al. v. Chicago, Burlington & Quincy et al.—Opinion by Commissioner Harlan.

Through error of a railway agent complainants were unable to use the return coupons of their round-trip special excursion tickets with stop-over privilege, but without additional cost were supplied by the carrier with regular limited tickets. Upon complaint filed setting up claim for damages for loss of employment as fruit pickers which complainants hoped to secure at a point where their original tickets permitted stop-over; but such damages are altogether too speculative to be accepted either as the basis for an order by the commission or for a judgment in a court of law.

Fruit Rates from Arkansas.

Ozark Fruit Growers Association v. St. Louis & San Francisco et al. Opinion by Commissioner Lane.

Rates for the transportation of apples via defendants' lines from the Ozark fruit region in Arkansas and Missouri to St. Louis, Mo., and Kansas City, and to points in Tennessee, South Carolina, Georgia, Florida, Alabama, Mississippi and Louisiana

found not unreasonable. Minimum weight applicable on carload shipments of apples via defendants' lines found not unreasonable.

Rates for the transportation of apples via defendants' lines from the Ozark fruit region to points in Oklahoma and Texas found unreasonable. Reasonable rates prescribed for the future.

Rates on Fertilizer.

Virginia-Carolina Chemical Co. v. St. Louis Southwestern. Opinion by Commissioner Clements.

Defendant's rates on fertilizer from Shreveport, La., to certain Arkansas destinations named in the report found unreasonable, and reasonable maximum rates prescribed for the future. Reparation awarded. Fertilizer is a low-grade traffic, subject to no great risk in transit, and requiring no special service for its transportation in the sense that "special service" is generally understood. Its free movement and use is an auxiliary tending to produce and furnish a larger volume of traffic, and thus promote the prosperity of carriers and their patrons; so that, considering both commercial and transportation conditions, it is entitled to comparatively low rates.

STATE COMMISSIONS.

The Railroad Commission of Louisiana has modified its order regarding the reweighing of cars loaded with lumber when weights are disputed. The order as modified provides that for the service of reweighing a car no charge shall be made by the carrier except when the weight claimed by the consignee is not verified within 1 per cent., in which case the carrier may charge $2.50 per car. Consignee, if an additional day is required by the delivering carrier to reweigh the car, shall be allowed one day's free time in addition to the free time allowed under the car service rules of the Commission. When the consignee so requests, the reweighing shall be in his presence or that of his authorized agent, provided no delay be occasioned by compliance with this request.

The Oregon Railroad Commission has demanded that the Oregon Short Line shall make reductions in wool rates from Huntington, Ontario, Vale and other points on its lines in Oregon, to Chicago, New York, Boston, Philadelphia and other points in the East. It has also notified the Northern Pacific, the Astoria & Columbia River, the Spokane, Portland & Seattle, the Oregon Short Line, the Oregon Railroad & Navigation Company and the Southern Pacific that it considers unreasonable and unjust the increases in eastbound transcontinental rates that were made on January 1, 1909, and asks that the rates in effect prior to that date be restored. The Commission is carrying out the state law, which requires it to give such notices before complaining against rates that it regards unjust to the Interstate Commerce Commission. If the reductions it asks are not made it will no doubt complain to the Interstate Commission.

The Wisconsin Railroad Commission has ordered the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Wisconsin Central, the Chicago, St. Paul, Minneapolis & Omaha and the Illinois Central, to reduce their rates on milk and cream from 5 to 20 per cent. It found after investigation that the rates on those commodities as a whole in the state were unreasonable and so adjusted as not to meet conditions. The following are the schedules prescribed by the Commission for distances of 5 to 100 miles: Five gallons of milk, distance of five miles, 7 cents; eight gallons of milk, distance of five miles, 9 cents; ten gallons milk, distance of five miles, 10 cents; five gallons of cream, five miles, 7 cents; eight gallons of cream, five miles, 10 cents; ten gallons of cream, five miles, 12 cents. Distance of twenty miles—Five gallons of milk, 8½ cents; eight gallons, 10½ cents; ten gallons, 13 cents; five gallons cream, 11 cents; eight gallons of cream, 15 cents; ten gallons cream, 18 cents. Distance of 100 miles—Five gallons of milk, 16 cents; eight gallons of milk, 21 cents; ten gallons of milk, 25 cents; five gallons of cream, 19 7-10 cents; eight gallons of cream, 27 cents; ten gallons of cream, 30 cents.

New York: Dissenting Opinion in Buffalo, Rochester & Eastern Case.

Commissioner T. M. Osborne, of the New York State Public Service Commission, Second district, who did not sign the report made by the Commission on the Buffalo, Rochester & Eastern matter (*Railroad Age Gazette*, March 26, page 607), has published his reasons for dissenting from the majority opinion, the principal one of which is that the Commission has no duty to prevent people from making bad investments.

He says: "To attempt that will open the door to all forms of extravagant paternalism. It is our business, as I take it, to prevent fraud and dishonesty, and to stop over-capitalization wherever possible in all future issues of public service corporation securities, as such over-capitalization also tends to result in fraud upon the public.

"This Commission has already pointed out more than once that when it authorizes the issue of new securities by existing public service corporations the purchasers of such securities must take the risk involved in the possibility of existing over-capitalization. It is primarily because this wise attitude seems to me to be altered in this present decision that I dissent.

"We are setting up our business judgments as against those who are most interested—because they are the ones who propose to put their money into the road. * * * If not today, then in some future day, a railway will certainly be built along this line. As our country doubles and trebles its present population some time in the future the state will be forced to allow this highway to be utilized. It seems to me to be a grave question whether experience has not shown that when a railway corporation attains a certain size it becomes as an organization unwieldy and unable to handle its own facilities to the best advantage. There is, to be sure, no logical reason why an organization of any kind should not retain its relative efficiency as it grows larger; nevertheless I am inclined to believe that there is a point beyond which any railway organization loses effective force from the mere excess of its own weight. The troubles of the New York Central in 1907 were due not alone to deficient equipment, but largely to deficient management."

In closing Mr. Osborne says:

"First—I think the majority have failed to give sufficient weight to the claims of the various communities through which the Buffalo, Rochester & Eastern proposes to pass.

"Second—Or to the serious situation involved in the relatively diminishing export trade of New York and Boston.

"Third—That if any project is a proper one in itself, honestly exploited and not contrary to public policy, this commission should not abandon its wise course of permitting investors to run their own risks, and should not undertake in a paternalistic spirit to pass final judgment upon the wisdom or unwisdom of it as a proposed investment.

"Fourth—And so far as the action of the commission perpetuates the monopoly of the New York Central over the great commercial highway of central New York, it is contrary to sound public policy."

COURT NEWS.

The Supreme Court of the United States in the case of the St. Paul, Minneapolis & Manitoba and the Great Northern railways versus the city of Minneapolis holds that a city can compel a railway company to bridge a street crossing when the street has been established subsequent to the laying of the tracks the same as though the street had been laid out first.

The Attorney-General, as *amicus curiae*, has filed a brief in the Connecticut Supreme Court in a case brought under the Employers' Liability law, which was passed by Congress in April, 1908. The plaintiff is E. C. Mondou, who was an employee of the New York, New Haven & Hartford. The government intervenes with a view to hastening the settlement of all questions relative to the constitutionality of the act.

The Indiana Supreme Court in the case of Howard v. the Indiana Union Traction Company has decided that it is the

duty of a motorman operating a heavy interurban car to have and keep perfect control of his car at street crossings; failing to do so he renders the company liable for damages to one attempting to cross the tracks in an automobile. The interurban car has not a superior right to the street and an automobilist is not legally bound to stop, look and listen before attempting to cross the tracks.

The railways of Alabama have asked the Supreme Court of the United States to review the decision of the Circuit Court of Appeals, which has just sustained the laws passed in Alabama in 1907, limiting passenger fares to 2 cents a mile and prescribing freight rates on a large number of commodities. It is asserted in the petition that the decision of the Court of Appeals in effect "precludes all the circuit courts in the fifth circuit from ever hereafter granting an interlocutory injunction against the enforcement of rates made by a state legislature."

The United States Circuit Court of Appeals at San Francisco handed down a decision on May 3 reversing the decision of the United States District Court which resulted in a fine of $330,000 being imposed on the Atchison, Topeka & Santa Fe for giving rebates to the Grand Canyon Lime & Cement Co. In the lower court the company was convicted on 66 counts and was fined $5,000 on each count. The Circuit Court of Appeals in passing on the case said "the Interstate Commerce act forbids wilful departure from the legal rate and the question of intent must be considered, and, this being so, it necessarily resulted that the district court erred in withdrawing from the jury evidence that more or less lime, which was the commodity on which rebates were paid, shook out of the car in transit. It will be recalled that in this case the shipper claimed that out of a total of 400 cars that he had shipped, 78, while loaded to a minimum of 40,000 lbs. at point of origin, showed a total shortage of over 100 tons in weight at destination. An arrangement was made between the shipper and the Chief Clerk in the freight department of the Santa Fe at Los Angeles that if the shipper would waive his claim for the loss of the lime, which apparently had shaken out of the car in transit, the road would make a corresponding deduction from his freight bills, which amounted to from 35 cents to $13 per car, or an aggregate of $400. Every count in the indictment on which the Santa Fe was convicted was based on a concession with respect to one of these 78 carloads of lime. A full statement of the railway's position in the matter was made by President E. P. Ripley, of the Santa Fe, in a letter to *The Railway Age*, which was published November 29, 1907, page 757. Mr. Ripley was subsequently denounced by President Roosevelt in a message to Congress for his criticisms of the decision of the district court, but the decision of the Circuit Court of Appeals apparently sustains Mr. Ripley's contention that the decision of the lower court was unsound.

The Texas Supreme Court holds that the switching of trains in a city does not constitute a nuisance. The case, decided April 28, was one brought by a hotel proprietor at El Paso against the Galveston, Harrisburg & San Antonio. The complainants asked for a perpetual injunction to restrain the road from using its tracks on main street for yard and station purposes, switching, making up trains, etc., alleging that the value of their hotel, which is but 120 ft. from the tracks, was depreciated. The trial court issued an injunction restraining the company from using the tracks in question except for the moving of its regular trains in entering and leaving the city. The Appellate Court sustained this decision. But the record showed that the railway had been authorized by a city ordinance to build the tracks, and that they were in use before the hotel was bought by the plaintiffs—in fact, had been in use for 21 years, and, therefore, the Supreme Court holds that the use of the tracks which are enjoined was lawful and indispensable to the operation of the railway; that it cannot be prevented without destroying the usefulness of this public utility. Continuing, the court says: A railway cannot be operated without locomotives, which, being moved by steam, must produce noises. If removed beyond the limits of a city, so as to place the yards out of contact with business houses and residences, their value to the public would be greatly impaired. Some one must suffer these inconveniences rather than that the public interest should suffer. If the defendant were compelled to remove to another part of the city, the same nuisance to other people would be caused by the same necessary operation of the machinery, and the citizens at that point could with greater propriety than plaintiffs (in this suit) seek another injunction. These conflicting interests call for a solution of the question by the application of the broad principles of right and justice, leaving the individual to his remedy by compensation and maintaining the public interests intact. This works hardships upon the individual, but they are incident to civilization with its physical developments, demanding more and more the means of rapid transportation of persons and property.

Missouri Passenger Rate Situation.

It was erroneously stated in this paper on April 23 that all the Missouri lines had decided to make passenger fares 2½ cents a mile. When that statement was made it was understood that an agreement had been reached, but this turns out to have been a mistake. The Burlington, the Rock Island, the Frisco and the Alton announced a 2½-cent fare, and put it in effect on May 1. A number of roads, including the Santa Fe, the Gould lines, and the Missouri, Kansas & Texas, favored a 3-cent fare, and believed that no change in the rate should be made until the litigation in the federal and state courts was ended. They contended that the effect of Judge McPherson's decision in the federal court was to authorize a return to the old rate of 3 cents. The result of this difference of opinion was that beginning with May 1 part of the roads, as already stated, adopted a 2½-cent rate, while the others kept the 3-cent rate in force.

On April 28 Judge McPherson rendered at Kansas City a supplementary opinion in the rate cases, in which he refused to change his original ruling that the costs of the suit must be divided between the railways and the state equally. Referring to the contention of counsel for the railways that the court erred in saying in the original decision that a 2½-cent rate would be fair on the stronger lines and a 3-cent rate on the weaker lines, Judge McPherson said, that of course this statement was *obiter dictum*, as a court cannot fix rates; but because it was a dictum was no reason for not saying it. He added that he could fairly have said that the St. Louis & Hannibal and the Kansas City, Clinton & Springfield should have 4 cents or more per passenger per mile. Continuing Judge McPherson said:

"Passengers, like consumers, have rights. One of these rights is to have fares fixed reasonably low. But the term reasonable is a comparative one. It must be in proportion to what it is worth, and the better the service, the more it is worth. And the public is entitled to demand efficient service, provided always such is paid for.

"Whether the trains are expensive or inexpensive, daylight or night trains, through or local trains, main line or branch trains, roads through the hills, of Central Missouri or the Ozarks or over the prairies, and whether the trains carry few or many passengers, are matters largely passed over as if of no importance. To me they seem of great importance. Evidences of kindly feeling for their fellowmen need not be wholly displayed toward the man who pays $6 per year for passenger fares. A kindlier disposition would suggest an equitable division of sympathy toward the railway employees. Thousands of them have already been 'let out' because of decreased earnings."

The Gould Lines and other roads secured an order from the Missouri supreme court on May 1, prohibiting Judge Williams, of the state circuit court at St. Louis, from proceeding with the cases to enjoin the railways from restoring the 3-cent fare, which were brought by the circuit attorney at St. Louis. The writ of the supreme court was made returnable on May 15.

At Jefferson City, May 4, Attorney-General Major filed *quo warranto* proceedings in the supreme court to oust the eighteen Missouri roads from the state or to fine them for entering into an alleged conspiracy to put into effect unlawful rates.

The Lower House of the legislature on the same day passed the drastic Speer bill with an emergency clause. This prohibits railways from charging more for intrastate than interstate passengers.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF MARCH, 1909.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenues (or deficit).	Outside operations. net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	General.	Total.					
Bangor & Aroostook	515	$260,348	$40,651	$311,659	$39,369	$31,304	$2,889	$87,549	$10,845	$171,956	$139,703	.....	$1,500	$138,203	$27,083
Bessemer & Lake Erie	201	259,782	19,598	284,410	42,898	82,065	7,080	109,270	6,641	247,954	36,456	.....	6,000	30,456	†38,053
Buffalo & Susquehanna	373	177,924	15,455	199,093	33,127	49,620	1,594	83,792	6,867	175,000	24,093	$134	4,000	20,227	†21,092
Buffalo, Rochester & Pittsburgh	568	469,213	63,517	546,030	39,357	136,724	9,363	169,091	12,001	366,536	179,494	65*	15,000	164,429	†13,201
Central New England	294	180,872	23,196	218,599	19,319	21,295	3,723	73,855	2,846	121,038	97,561	.....	5,600	91,961	57,550
Chesapeake & Ohio	1,896	1,771,951	347,283	2,249,643	242,612	412,947	36,308	629,851	42,126	1,363,844	885,799	2,202	67,100	820,901	218,146
Chicago & North Western	7,635	3,703,903	1,230,583	5,408,063	506,351	710,088	94,704	2,084,639	109,743	3,505,525	1,902,538	3,067*	210,000	1,689,471	†72,990
Chicago, Burlington & Quincy	9,023	4,874,952	1,436,355	6,861,502	847,491	1,099,627	137,097	2,127,135	174,393	4,385,743	2,475,759	18,253*	212,600	2,244,906	152,355
Chicago, Lake Shore & Eastern	670	346,029	.....	399,395	26,293	79,366	1,419	104,065	5,653	216,796	182,599	.....	3,000	179,599	56,890
Chicago, St. Paul, Minn. & Omaha	1,739	776,421	293,561	1,146,191	104,465	151,146	24,367	468,909	27,085	775,972	370,219	979*	53,008	316,232	†12,553
Colorado & Southern	1,251	518,915	83,702	641,987	85,094	144,724	13,635	201,775	24,607	469,835	172,152	727*	21,225	150,200	9,146
Colorado Midland	337	142,412	20,937	180,019	23,886	32,543	10,122	94,649	5,746	166,946	13,073	494*	7,650	4,929	†24,867
Cumberland Valley	162	142,074	40,039	190,910	21,292	25,455	4,254	59,824	5,978	116,803	74,107	63	3,713	70,457	9,088
Delaware, Lackawanna & Western	893	2,350,910	458,669	2,969,929	190,398	412,104	51,177	815,298	52,392	1,521,369	1,448,560	31,733	98,400	1,381,893	593,301
Detroit & Mackinac	348	97,371	21,750	124,672	11,996	16,474	1,354	35,198	2,388	67,410	57,262	152*	6,877	50,233	18,616
Elgin, Joliet & Eastern	239	236,821	155	241,763	17,049	30,887	2,744	69,963	6,491	127,134	114,629	.....	10,500	*104,129	43,634
El Paso & Southwestern	867	601,975	82,834	712,678	75,291	82,537	8,880	197,866	33,113	397,687	314,991	497*	17,167	*297,327	.....
Gulf & Ship Island	307	128,453	26,442	163,616	33,164	19,798	1,004	51,860	7,066	112,892	50,724	.....	6,850	43,874	9,931
Gulf, Colorado & Santa Fe	1,518	659,405	217,625	948,201	174,941	127,213	21,826	377,018	29,008	730,006	218,195	.....	32,649	185,546	129,441
Kansas City Southern	827	553,039	106,749	736,114	78,765	84,067	21,901	233,097	28,978	446,808	289,306	.....	25,344	263,962	42,691
Lake Erie & Western	724	296,912	51,715	366,471	60,045	82,920	9,754	149,625	9,871	312,215	54,256	.....	17,000	37,256	†7,919
Lehigh Valley	1,446	2,436,943	284,791	2,808,914	275,630	442,246	66,878	849,489	58,597	1,692,840	1,116,074	35,310*	94,600	986,163	353,799
Long Island	392	260,194	319,065	598,582	97,936	109,900	9,037	296,307	16,462	529,642	68,940	39,464	71,413	36,991	82,452
Missouri, Kansas & Texas	3,072	1,279,854	552,693	1,960,188	296,353	185,768	55,175	792,575	70,519	1,400,390	559,798	694	70,007	490,485	126,925
New York Central & Hudson River	3,587	4,482,147	2,014,546	7,264,075	771,722	1,279,830	171,893	2,890,301	164,840	5,278,586	1,985,489	10,602	353,435	1,642,655	693,113
New York, Ontario & Western	546	642,167	84,876	749,972	74,821	118,428	9,534	287,000	17,240	507,023	242,949	2,090*	14,000	226,859	80,671
New York, Philadelphia & Norfolk	112	192,423	30,872	238,643	28,746	41,280	2,674	89,444	9,036	171,180	67,463	.....	6,250	61,213	12,803
Norfolk & Southern	582	177,936	43,447	234,304	18,264	21,738	4,025	73,187	13,345	130,559	103,745	853*	5,200*	97,692	54,305
Norfolk & Western	1,930	2,132,599	261,395	2,467,958	262,634	437,096	41,888	712,974	54,158	1,508,750	959,208	3,024*	82,300	873,884	167,918
Northern Central	461	791,224	163,948	1,005,140	131,603	188,786	11,683	446,833	21,451	800,356	204,785	251	32,130	172,906	66,568
Northern Pacific	5,695	3,897,394	1,243,706	5,477,835	403,707	664,487	80,220	1,586,347	85,309	2,820,070	2,657,765	16,075	191,724	2,482,116	433,485
Pennsylvania R. R. Co.	4,048	8,846,944	2,276,995	11,818,675	1,572,652	2,657,985	146,255	4,128,238	305,643	8,810,773	3,007,902	98,016*	239,161	2,670,725	317,814
Philadelphia, Baltimore & Washington	716	680,718	631,826	1,451,339	193,723	239,138	25,459	603,542	39,696	1,101,558	349,781	.....	37,435	312,346	90,394
Pittsburgh & Lake Erie	191	762,951	88,967	880,180	114,770	117,358	15,346	238,390	19,614	505,478	374,701	398*	17,000	357,303	10,858
Southern Railway	7,055	3,259,961	1,047,644	4,668,154	499,213	856,152	108,060	1,600,123	149,527	3,213,075	1,455,079	11,491	160,662	1,305,908	271,650
West Jersey & Seashore	356	136,527	191,879	352,672	73,225	51,728	8,109	173,049	8,445	314,556	38,116	484*	26,680	10,952	17,795

NINE MONTHS OF FISCAL YEAR.

Bangor & Aroostook	515	$1,678,592	$421,247	$2,201,792	$387,441	$250,820	$26,201	$661,771	$94,734	$1,420,967	$780,825	.....	$13,500	$767,325	$319,500
Bessemer & Lake Erie	201	4,070,041	229,710	4,347,507	436,380	854,011	54,537	1,208,750	79,997	2,633,675	1,713,832	.....	73,000	1,640,832	†89,923
Buffalo & Susquehanna	373	1,534,209	153,042	1,741,890	294,918	409,326	21,421	673,875	62,020	1,461,560	280,330	709*	36,000	243,621	83,010
Buffalo, Rochester & Pittsburgh	568	4,380,465	667,235	5,250,875	634,166	1,261,297	74,863	1,590,093	122,335	3,682,754	1,568,121	262	135,000	1,433,383	†190,881
Central New England	294	1,494,898	248,509	1,851,279	283,963	185,720	16,658	640,215	26,256	1,152,812	698,467	.....	50,400	648,067	391,556
Chesapeake & Ohio	1,896	15,438,365	3,345,640	19,636,252	2,186,636	3,749,951	328,265	5,477,077	384,970	12,126,899	7,509,353	9,972*	600,300	6,899,081	670,891
Chicago & North Western	7,635	33,136,155	12,887,715	50,089,788	5,791,563	5,745,272	842,407	18,734,906	844,045	31,958,193	18,131,595	7,713	2,050,000	16,089,308	1,317,640
Chicago, Burlington & Quincy	9,023	40,053,751	14,846,534	59,991,514	8,139,118	9,874,881	1,151,382	18,600,835	1,521,015	39,293,231	20,698,283	*111,371	1,913,400	18,673,512	716,977
Chicago, Lake Shore & Eastern	670	2,738,038	.....	3,015,539	249,370	681,325	10,429	943,535	55,072	1,939,731	1,075,807	.....	27,000	1,048,807	31,745
Chicago, St. Paul, Minn. & Omaha	1,739	6,520,031	3,085,776	10,295,906	1,176,950	1,104,853	196,356	3,826,473	260,648	6,565,280	3,730,626	1,439	476,841	3,255,224	295,565
Colorado & Southern	1,251	5,089,197	1,132,684	6,566,178	812,024	1,189,004	124,421	2,010,063	235,876	4,371,388	2,194,790	2,011	189,257	2,007,544	†25,897
Colorado Midland	337	1,249,553	278,113	1,761,814	220,146	246,299	88,634	744,985	53,150	1,353,214	408,600	3,347*	67,899	337,354	9,781
Cumberland Valley	162	1,342,541	424,185	1,858,434	180,017	178,930	34,564	580,304	49,522	1,023,337	835,097	4,397	33,417	806,077	6,824
Delaware, Lackawanna & Western	893	18,548,155	4,932,761	25,025,152	2,291,564	3,426,682	434,836	6,999,858	491,069	13,644,009	11,381,143	221,714	799,200	10,803,657	871,112
Detroit & Mackinac	348	595,772	216,819	861,854	134,997	137,733	16,200	285,696	24,323	598,949	262,905	2,725*	64,795	195,384	†18,362
Elgin, Joliet & Eastern	239	1,806,803	462	1,864,471	188,519	292,642	23,286	605,261	68,396	1,178,104	686,367	.....	86,500	599,867	†10,931
El Paso & Southwestern	867	4,386,255	719,858	5,347,061	632,700	716,254	83,750	1,460,103	217,557	3,110,364	2,236,697	13,685*	143,043	2,079,969	.....
Gulf & Ship Island	307	1,074,068	267,764	1,428,953	300,894	214,170	12,213	468,807	65,195	1,061,279	367,674	.....	40,658	327,016	†1,316
Gulf, Colorado & Santa Fe	1,518	7,241,828	2,236,555	9,978,319	1,509,434	1,547,262	184,014	3,443,185	286,033	6,969,928	3,008,391	.....	247,623	2,760,768	1,528,168
Kansas City Southern	827	4,907,895	988,284	6,495,672	701,778	756,260	195,850	2,068,160	244,930	3,966,978	2,528,694	.....	246,247	2,282,447	101,488
Lake Erie & Western	724	2,514,791	589,428	3,279,507	449,360	661,958	96,124	1,291,989	92,132	2,591,563	687,944	.....	153,760	534,184	†43,752
Lehigh Valley	1,446	20,799,955	2,905,049	24,513,966	2,603,675	4,492,569	585,139	7,531,256	486,728	15,699,367	8,814,599	90,611*	815,400	7,908,588	†477,463
Long Island	392	1,960,032	3,773,086	5,970,537	754,769	925,923	119,939	2,766,325	158,210	4,725,166	1,245,371	658,415	245,121	1,658,665	631,310
Missouri, Kansas & Texas	3,072	13,192,755	5,343,768	19,617,767	2,664,110	2,836,968	435,598	7,184,758	616,675	13,738,109	5,879,658	7,175*	876,766	4,995,717	†558,960
New York Central & Hudson River	3,587	37,919,929	20,381,797	65,093,826	7,518,850	11,508,650	1,584,552	24,518,648	1,502,646	46,633,346	18,460,480	95,492	3,417,816	15,138,157	1,315,697
New York, Ontario & Western	546	4,825,922	1,173,738	6,239,297	676,551	1,068,927	87,459	2,321,304	133,517	4,287,758	1,951,538	30,843*	134,417	1,786,279	50,860
New York, Philadelphia & Norfolk	112	1,654,700	290,886	2,087,960	191,730	375,699	27,495	772,286	94,084	1,461,294	626,666	.....	56,040	570,626	†49,883
Norfolk & Southern	582	1,173,332	469,233	1,766,721	231,151	187,708	37,494	570,473	130,266	1,157,092	609,629	1,668*	54,800	553,161	279,964
Norfolk & Western	1,930	18,295,095	2,617,315	21,646,711	2,339,990	3,666,363	355,649	6,268,552	476,091	13,106,645	8,540,066	4,342*	761,900	7,773,824	732,426
Northern Central	461	6,537,722	1,497,548	8,534,027	748,904	1,861,170	112,343	3,866,004	177,670	6,766,091	1,767,936	5,606	188,247	1,585,295	†268,313
Northern Pacific	5,695	35,981,928	12,636,947	51,580,220	5,297,273	6,027,036	630,379	15,026,459	811,533	27,792,680	23,787,540	353,059	2,115,545	22,025,054	†136,946
Pennsylvania R. R. Co.	4,048	74,574,290	21,528,638	102,996,473	11,695,223	20,661,426	1,359,113	36,536,379	2,570,025	72,822,166	30,174,307	*79,137	1,633,875	28,461,294	†1,357,522
Philadelphia, Baltimore & Washington	716	5,832,311	5,157,341	12,349,237	1,560,474	2,197,758	195,374	5,129,646	271,570	9,354,822	2,994,415	.....	286,569	2,707,846	77,375
Pittsburgh & Lake Erie	191	7,621,254	899,529	8,796,098	1,061,641	845,120	118,928	2,114,561	187,897	4,328,147	4,467,951	2,959*	148,526	4,316,466	†660,126
Southern Railway	7,055	26,375,895	10,288,442	39,872,014	4,665,112	6,201,903	915,364	13,912,205	1,299,283	26,993,867	12,878,147	105,625	1,436,545	11,547,227	3,317,682
West Jersey & Seashore	356	1,107,342	2,387,461	3,700,886	584,463	513,976	91,710	1,575,782	70,877	2,836,808	864,078	53,994	163,579	754,493	†102,254

*Deficit. †Decrease.

The Westbound "Rate War."

Announcements of reductions in westbound freight rates have appeared in the newspapers about every day during the past week, but it is difficult to tell precisely what they mean. Each cut is to take effect a month after it is published, but each is likely to be followed by a further cut by a rival line; and all of them have to do only with the comparatively small volume of freight which goes by the slow or roundabout routes. On April 21 the Chesapeake & Ohio, taking freight from New York to Newport News by water, announced reductions of 3 cents per 100 lbs., on first class, and different reductions on the other classes, to meet the cut made by the Boston & Maine in February. Presumably these rates apply only on import traffic, though none of the reporters seem to care enough about the point to say whether they do or do not. On April 25 the Baltimore & Ohio followed the Chesapeake & Ohio, but taking off different percentages. This is said to be the seventh cut after that of the Boston & Maine, and it left the B. & M. in the same relative position that it was before the cutting began. Import rates were further reduced by the B. & O. on the 29th. The Pennsylvania made reductions from Philadelphia, but not from other points. On May 1 the Interstate Commerce Commission received notice of further reductions by the Boston & Maine, designed to neutralize those made by the Southern lines. Later despatches from Washington indicated that all of the important trunk lines had filed new tariffs for rates on imported goods out of New York, designed to restore the differential between that port and Boston. Heretofore the roads out of New York had no import class rates, but the new tariffs have them, as follows: From New York to Chicago first class, 72; second class, 61; third class, 50; fourth class, 34; fifth class, 29, and sixth class 23½. The roads which have made these changes are the Central of New Jersey, the Pennsylvania, the Lackawanna, the Erie, the Lehigh Valley, and the New York, Ontario & Western.

On the 29th the Commission was notified of changes made by the lines which take freight by water to Norfolk, designed to put them on an equality with the rail and lake lines. These lines are the Merchants and Miners' Transportation Company, from Boston; the Old Dominion Steamship Company, from New York; the Clyde Steamship Company, from Philadelphia, and the Chesapeake Steamship Company and the Baltimore Steam Packet Company, from Baltimore. The tariffs read in connection with the Atlantic Coast Line, the Southern Railway, the Chesapeake & Ohio, the Norfolk & Western and the Seaboard Air Line, but apply only to Chicago and do not include common points, or points beyond; and they are not confined to import traffic. These tariffs make a reduction of 8 cents per 100 lbs. on first-class freight from Boston to Chicago, and 3 cents per 100 lbs. from New York, Philadelphia and Baltimore to Chicago. Proportionate reductions are made on other classes. They become effective on June 1. It is stated that the reductions are made solely with the object of bringing all the water and rail tariffs to common level. Before 1907 the rates on the rail and lake routes did not include marine insurance, and shippers or consignees had to pay insurance, whereas, by the ocean and rail routes, the insurance charges were included. But in 1907 the rail and lake concerns included insurance in their rates, without raising the tariffs, and this resulted in the establishment of a differential, which the ocean lines now aim to abolish. Rates to points other than Chicago have been on practically the same scale by all the water and rail routes.

Westbound transcontinental tariffs which have been filed to go into effect June 5 are reported by the Interstate Commerce Commission, and are said to show reductions of 10 cents per 100 lbs. in all commodity tariffs, meaning, presumably, all commodities below fourth class.

Freight Car Balance and Performance.

Arthur Hale, Chairman of the Committee on Car Efficiency of the American Railway Association, in presenting statistical bulletin No. 44, covering car balance and performance for November, 1908, says: "During November the number of surplus cars, which had been decreasing steadily since June,

Car Balance and Performance in November, 1908.

	New England.	New York, New Jersey, Del., Md., Eastern Pa.	Ohio, Indiana, Mich., Western Pa.	Virginia, W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minnesota.	Montana, Wyo., Neb., Dakotas.	Kansas, Colo., Okla., Ind. T., Mo., Ark.	Texas, Louisiana, N. Mex.	Oregon, Idaho, Nev., Cal., Arizona.	Canadian Lines.	Grand total.
Revenue freight cars owned	72,873	656,477	277,968	130,278	172,731	369,261	15,520	135,077	26,258	112,007	100,522	2,068,972
Average number of system cars on line	49,487	440,848	198,268	88,107	111,409	285,613	6,104	90,085	13,027	56,342	73,760	1,413,050
Railroad-owned cars: Av. foreign on line	34,255	179,773	73,037	30,955	44,211	102,058	11,508	56,227	27,584	45,629	18,944	624,181
Total cars on line	83,742	620,621	271,305	119,062	155,620	387,671	17,612	146,312	40,611	101,971	92,704	2,037,231
Excess	10,869	.....	.....	.....	.....	18,410	2,092	11,235	14,353	.....	.....	.....
Per cent. cars on line to total owned:												
Home	68	67	71	67	64	77	39	66	49	50	73	68
Foreign	47	28	26	24	26	28	74	42	105	41	19	30
All railroads	115	95	97	91	90	105	113	108	154	91	92	98
Private cars on line	2,994	39,286	12,181	3,270	6,348	14,629	2,026	8,280	3,141	8,089	4,137	103,481
Total, all cars on line	86,736	659,907	283,486	121,432	161,968	402,300	19,638	154,592	43,752	110,060	96,841	2,140,712
Per cent. of cars in shop	6.35	8.05	8.62	8.86	11.89	5.00	4.75	13.56	5.53	5.88	8.95	7.99
No. of freight engines owned	1,122	9,835	3,794	2,153	2,392	6,298	440	2,486	712	2,340	2,113	33,685
Av. cars on line per freight engine owned	77	67	75	56	67	64	45	62	61	47	46	64
Total freight-car mileage	43,631,855	467,766,065	170,154,762	79,587,704	110,971,067	282,129,881	26,071,750	89,660,814	33,801,559	106,912,153	91,360,127	1,501,047,737
Average miles per car per day	16.4	23.6	20.0	21.8	22.8	23.5	44.3	20.1	25.8	32.4	31.6	23.5
Per cent. loaded mileage	71.9	66.3	66.5	68.4	72.4	72.5	72.1	70.2	68.7	71.1	72.9	69.3
Ton-miles of freight, Inc. Co. freight	438,650,807	7,224,728,480	2,417,709,172	1,080,576,974	1,545,564,439	2,406,251,212	381,720,289	1,213,468,895	387,354,828	1,593,270,687	1,277,189,338	20,975,485,121
Average ton-miles, including Co. freight:												
Per car-mile	10.3	15.4	15.4	13.7	14.0	13.8	15.0	13.6	11.6	14.9	13.9	14.5
Per loaded car-mile	14.3	23.3	23.2	20.0	18.0	19.5	20.8	19.5	16.9	21.0	19.1	21.0
Per car per day	168	365	309	299	320	327	686	273	302	484	440	341
Gross freight earnings	$5,085,564	$42,884,971	$14,537,963	$7,704,028	$10,929,349	$20,361,553	$3,265,742	$10,876,791	$4,150,763	$15,005,465	$7,786,363	$142,588,552
Average daily earnings: Per car owned	$2.33	$2.18	$1.74	$1.97	$2.13	$2.39	$7.01	$2.69	$5.27	$4.46	$2.58	$2.40
Per railroad-owned car on line	2.02	2.31	1.79	2.16	2.36	2.28	6.18	2.48	3.40	4.90	2.80	2.44
All cars on line	1.95	2.17	1.71	2.11	2.26	2.18	5.54	2.35	3.16	4.54	2.68	2.32

began to increase, the average for the month being 127,000 daily, or 5.93 per cent. of the total equipment. These cars, together with 2.97 per cent. 'excess' shop cars, represent the proportion of the equipment that contributed nothing to the car mileage, ton mileage or freight earnings reported in this bulletin. Making the usual adjustments, we secure the following results:

	Average miles per day.		Average ton-miles per car per day.		Average earnings per car per day.	
	Inc. surp. cars.	Exc. surp. cars.	Inc. surp. cars.	Exc. surp. cars.	Inc. surp. cars.	Exc. surp. cars.
December, 1907	21.9	23.9	289	316	$1.98	$2.17
January, 1908.	20.8	24.9	277	325	1.81	2.17
February, 1908	19.7	23.8	271	328	1.82	2.20
March, 1908...	21.2	25.5	290	348	1.95	2.34
April, 1908...	19.6	24.5	258	324	1.83	2.29
May, 1908....	19.3	24.8	254	329	1.72	2.22
June, 1908....	19.6	24.7	276	347	1.88	2.37
July, 1908....	20.0	24.8	275	342	1.84	2.26
August, 1908..	20.8	25.1	292	354	1.98	2.40
Sept., 1908....	22.0	25.2	320	367	2.24	2.57
October, 1908..	23.8	25.9	346	376	2.33	2.54
November, 1908	23.5	25.8	341	375	2.32	2.55

"There is very little change in the averages shown in the above table, with the exception of the decreases in those that include surplus cars, which decreases are explained by the increase in idle equipment. The per cent. of loaded mileage was 69.3 per cent., a falling off from the averages for September and October of 0.3 and 1.4 respectively. This result is rather surprising in view of the outward flow of cars indicated by the car balance percentages, which show a further reduction in cars on home lines to 68 per cent. of the total.

"There is a slight improvement in the tons per loaded car for the period covered by this report, while the bad order equipment continues to decrease, the average being 7.99 per cent., or 0.89 less than during the previous month."

Traffic Club of St. Louis.

The Traffic Club of St. Louis gave a dinner at the Jefferson Hotel on May 4. Among the speakers were Judge Smith McPherson, United States District Judge for the Southern district of Iowa, and Frederick W. Lehmann, of St. Louis, President of the American Bar Association.

A Fast Freight Line.

It is cheaper to ship wool to Los Angeles and then reship it to Boston than it is to ship direct to Boston from Manti. The rate from Manti [124 miles south of Salt Lake City] to Los Angeles over the Salt Lake route, is 80 cents per 100 lbs. (distance about 750 miles); the rate from Los Angeles to Boston by way of Salt Lake is $1.10. The rate from Utah common points to Boston is $2.13, so by shipping his wool to Los Angeles, having it compressed there and then reshipping it to Boston, back over the same rails which it traversed to reach the southern California city, the Manti wool grower gets a benefit of 25 cents on every hundred pounds. One wool company has purchased about one-fourth of the wool clip of Utah this year, amounting to 4,000,000 lbs., and footing up in cash about $700,000. This company has shipped all its wool to California and then back to Boston, saving the difference of 23 cents. The B. Harris Co. has shipped its wool the same way, as have other shippers.—*Press despatch from Salt Lake City.*

FOREIGN RAILWAY NOTES.

A bill pending in the French Parliament securing pensions to employees is estimated by the companies to increase their obligations by 30,000,000 francs and by the Railway Minister by 25,000,000 francs a year.

The inquiries into the thefts of railway freight in Moscow have established that in the years 1905, 1906 and 1907 more than $15,000,000 worth was taken, mostly on two railways. There were regular bands of men who unloaded the freight, others who stored it and still others, including some reputable firms, who sold it. There has also been discovered a plant for manufacturing counterfeit railway tickets, which confined itself to one railway, and made the trifling profit of $65,000. The latter was betrayed by one of its members.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

J. L. Terry, clerk to the First Vice-President of the Denver, Laramie & Northwestern, has been elected Assistant Treasurer, with office at Denver.

J. D. McLennan has been appointed the Auditor of Freight Accounts of the Grand Trunk, with office at Montreal, succeeding William Clark, assigned to other duties.

E. F. Stephenson, who has previously been in Secretary Pardee's office, has been elected the Assistant Secretary of the New York Central & Hudson River, with office in New York. This is a new office.

F. S. Landstreet has been elected president of the New York Dock Co., succeeding David H. King, Jr., resigned. The company owns extensive terminals, including docks and storage warehouse facilities in South Brooklyn, N. Y.

T. C. Powell, Vice-President of the Southern Railway, has been relieved of supervision of the Operating department of the St. Louis-Louisville lines, but will continue to represent this road on the boards of directors of the Terminal Association of St. Louis and of the Kentucky & Indiana Bridge Company.

L. L. Losey, Chief Claim Agent of the Illinois Central, the Yazoo & Mississippi Valley and the Indianapolis Southern, having been granted a leave of absence, L. H. Kellogg has been appointed the Acting Chief Claim Agent. H. B. Hull has been appointed the Assistant Chief Claim Agent at Memphis, Tenn., with jurisdiction over all territory south of Fulton, Ky. E. W. Sprague has been appointed District Claim Agent of the Indianapolis Southern, with office at Chicago.

Operating Officers.

The new organization of the Operating department of the Southern Pacific Lines in Mexico is described in an article under General News.

T. C. Worthington has been appointed the Assistant Superintendent of the Houston division of the Galveston, Harrisburg & San Antonio, succeeding J. D. Brennan, resigned.

A. Wilcox, Superintendent of the Canadian Northern at Port Arthur, Ont., has been transferred as Superintendent to Dauphin, Man., and given charge of the Third district, succeeding J. W. Dawsey, resigned. S. S. Foley, Chief Train Despatcher at Dauphin, has been appointed the Superintendent of the Fifth district, with office at Saskatoon, Sask.

The titles of Resident Engineer, Master Mechanic, Trainmaster and Traveling Engineer have been abolished on the Texas & New Orleans and the Galveston division of the Galveston, Harrisburg & San Antonio, and C. A. Thanheiser, W. S. Cox, H. J. Micksch and F. Wessell, who have had these titles, respectively, are each given the title of Assistant Superintendent and will continue to be charged with the responsibilities heretofore devolving upon them, while assuming such other duties as may from time to time be assigned to them. See an item under General News.

C. P. Cooper, Manager of the St. Louis-Louisville Lines of the Southern Railway, has been appointed the General Agent, Operating department, with office at Memphis, Tenn., and his former office has been abolished. C. L. Harris, Superintendent at Knoxville, Tenn., has been appointed the General Superintendent of the St. Louis-Louisville Lines, with office at St. Louis, Mo. G. W. Taylor, General Superintendent of Transportation of the Southern Railway, has been appointed also the General Superintendent of Transportation of the St. Louis-Louisville Lines, with office at Washington, D. C. W. H. Gatchell, Superintendent of Transfers, has been appointed also the Superintendent of Transfers of the St. Louis-Louisville Lines, with office at Washington, D. C.

Traffic Officers.

H. E. Dengler has been appointed a Division Freight Agent of the Lehigh Valley, with office at Hazelton, Pa., succeeding C. A. Smith, deceased.

L. B. Burford has been appointed Chief of Tariff Bureau of the Erie, with office at 50 Church street, New York, succeeding H. Thompson, promoted.

N. W. Pringle has been appointed the New England Passenger Agent of the Lehigh Valley, with office at 39 Church street, New Haven, Conn.

F. S. Fisher has been appointed a Contracting Agent of the Missouri, Kansas & Texas, with office at Fort Worth, Tex., succeeding C. F. Smith, resigned.

L. H. Geller has been appointed the Southern Freight Agent of the Erie lines west of Buffalo, with office at Chicago, succeeding C. D. Turner, transferred.

V. D. Skipworth has been appointed the Traffic Manager of Schwarzschild & Sulzberger Co., in charge of all traffic and car line matters, with headquarters at Chicago, succeeding B. S. Cusey.

E. R. Puffer has been appointed the General Freight Agent of the Illinois and Iowa districts of the Chicago, Burlington & Quincy, Lines East of the Missouri river, succeeding W. B. Hamblin, deceased.

E. T. Campbell, Purchasing Agent of the Erie, has been appointed the Traffic Manager, with office at Chicago, succeeding D. W. Cook, promoted. Willard R. Collins succeeds Mr. Campbell, with office at New York.

C. F. Smith, Contracting Agent of the Missouri, Kansas & Texas, at Fort Worth, Tex., has been appointed the Traveling Freight Agent of the Louisiana Railway & Navigation Company for the state of Oklahoma, with office at Oklahoma City, Okla.

R. W. Andrews, Division Freight and Passenger Agent of the Missouri & North Arkanas, at Helena, Ark., has been appointed the General Freight and Passenger Agent, with office at Eureka Springs, Ark. The office of Division Freight and Passenger Agent at Helena has been abolished.

G. Stephen, Assistant General Freight Agent of the Canadian Northern, has been appointed the General Freight Agent, with office at Winnipeg, Man. W. G. Manders, chief clerk in the Freight Traffic department, succeeds Mr. Stephen, with office at Winnipeg. C. W. Cooper, Assistant General Passenger Agent, has been appointed the General Passenger Agent, with office at Winnipeg. R. G. Hall, Traffic Manager of the Duluth, Rainy Lake & Winnipeg, has been appointed a Commercial Agent of the Canadian Northern, with office at Chicago.

Engineering and Rolling Stock Officers.

J. H. Conlan, General Roadmaster of the Trinity & Brazos Valley, has resigned to engage in other business.

F. B. McCutcheon, Chief Engineer of the Gulf & Ship Island, has resigned and his former office has been abolished. W. T. Stewart has been appointed the Superintendent of Roadway, and will have charge of maintenance of way, bridges and buildings.

A. Stewart, General Superintendent of Motive Power and Equipment of the Southern Railway, with office at Washington, D. C., has been appointed also the General Superintendent of Motive Power and Equipment of the St. Louis-Louisville Lines of the Southern Railway, with office at Washington.

D. W. Lum, Chief Engineer of Maintenance of Way and Structures of the Southern Railway, with office at Washington, D. C., has been appointed also the Chief Engineer of Maintenance of Way and Structures of the St. Louis-Louisville Lines of the Southern Railway, with office at Washington.

H. A. Genung has been appointed Engineer in charge of Maintenance of Way, Bridges, Buildings and Water Service on the San Antonio division of the International & Great Northern, with office at San Antonio, reporting direct to the General Manager. O. H. Crittenden, Chief Engineer, is relieved of active duties on this division, except as Consulting Engineer.

George H. Burgess, Principal Assistant Engineer of the Erie, has been appointed the Chief Engineer of the Delaware & Hudson, with office at Albany, N. Y., succeeding James McMartin, resigned. Mr. Burgess was born on June 19, 1874, at Oshkosh, Wis. After graduating from the University of Wisconsin in 1895, having taken the civil engineering course, he began railway work as a rodman on the Pennsylvania Lines West. In October, 1896, he was appointed Assistant Bridge Inspector, and two years later was promoted to Bridge Inspector. In January, 1901, he became Assistant Engineer, holding this office until September, 1905, when he left the Pennsylvania to become Assistant Engineer on the Erie. In 1906 he was made Engineer of Terminal Improvements and was put in direct charge of the extensive terminal improvements being made at Jersey City, N. J. On May 1, 1908, he was appointed Principal Assistant Engineer, which office he has since held.

G. H. Burgess.

Purchasing Officers.

Willard R. Collins has been appointed the Purchasing Agent of the Erie, with office at New York, succeeding E. T. Campbell, assigned to other duties.

W. M. Netherland, General Storekeeper of the Southern Railway, has been appointed also the General Storekeeper of the St. Louis-Louisville Lines, with office at Washington, D. C.

OBITUARY.

John M. McCully, formerly Purchasing Agent of the Louisville & Nashville, died in Chicago last week from blood poisoning.

J. A. Perkins, formerly General Agent of the Star Union Line of the Pennsylvania at Milwaukee, Wis., died at Milwaukee on April 29. He was 79 years old. He represented the Star Union Line at Milwaukee from 1886 to 1901, when he retired, having reached the age limit.

Meed Stillwell, formerly a Superintendent of the Missouri Pacific, died May 3 of heart disease at his home in Bloomfield, N. J. He was born in 1851 and began railway work in 1869 as freight brakeman. In 1890 he was made a Superintendent of the Missouri Pacific and in 1904 retired from railway work.

Thomas W. Lee, General Passenger Agent of the Delaware, Lackawanna & Western until a few years ago, died on April 26 at Idaho Falls, Idaho. He began railway work in 1876 as a telegraph operator on the Baltimore & Ohio, and was consecutively to 1882 station agent, Train Despatcher and Yardmaster. From 1882 to 1887 he was Traveling Freight and Passenger Agent, Advertising Agent and Chief Clerk in the Passenger department of the Chicago, Burlington & Quincy. From 1887 to 1889 he was General Passenger Agent of the Lake Erie & Western; from 1889 to 1891, General Passenger Agent of the Oregon Railway & Navigation Co.; from 1891 to 1893, General Manager of the Galveston, Houston & Northern, now the Galveston, Harrisburg & San Antonio; from 1893 to 1897, Superintendent of the water lines of the Oregon Railway & Navigation Co., and from 1898 to 1899, Assistant to the Chairman of the Western Passenger Association. In 1899 he became General Passenger Agent of the Delaware, Lackawanna & Western, which office he held several years. During recent years he had been dealing in lands in Idaho.

Railroad Construction.

New Incorporations, Surveys, Etc.

ACME, RED RIVER & NORTHERN.—See Quanah, Acme & Pacific.

AMARILLO, STRATFORD & NORTHERN.—Organized in Texas to build a north and south line through Sherman, Moore and Potter counties, thence to a point either in Kansas or Colorado. It is expected that the line will be in operation from Stratford to Amarillo, or from Stratford to Canyon City within two years. E. C. Gordon and the Stratford Commercial Club are said to be interested.

BLUE VALLEY TRACTION.—An officer writes that preliminary surveys have been completed but no contracts for construction work have yet been let. There will be one or two bridges across the Blue river. Construction work will be comparatively easy, although in places the grade will approximate 5 per cent. for short distances. H. J. Smith, Ch. Engr., Kansas City, Mo. (April 16, p. 871.)

CANADIAN PACIFIC.—This company is building a diversion of its line on the Lake Superior division near Jackfish, Ont., extending from Steel siding to the crossing of the Steel river, about two miles. This is being done with the object of escaping the muskegs over which the line at present passes on four long pile trestles. It has been found that the muskeg is of such character that filling in the trestles on the existing line would be expensive and will involve interruption of traffic. The new line will be principally of rock and will be ready for traffic by Jan. 1, 1910.

CLINTON & OKLAHOMA WESTERN.—An officer writes that contracts for 20 miles of grading have been let and that the work is under way. F. L. Adams & Co., contractors, Oklahoma City, Okla. G. V. McClure, Ch. Engr., Clinton, Okla. (April 16, p. 871.)

COLORADO & SOUTHERN.—An officer of the Chicago, Burlington & Quincy (which recently acquired the Colorado & Southern) writes that the line originally located between Wellington, Colo., and Cheyenne, Wyo., has been revised, but construction in the near future is not being considered at the present time.

ENID, OCHILTREE & WESTERN.—An officer writes that financial arangements have been made to build this line. A grading contract has been let to A. Key, of Fort Worth, Tex., and several miles have already been graded out of Dalhart. The proposed route is from Dalhart southeast to Dumas, thence northeasterly via Hansford to Ochiltree, 112 miles. Arrangements made to extend the line to the eastern boundary of Texas and organize an auxiliary company in Oklahoma. G. M. Perry, Pres.; A. E. Wiest, Jr., Vice-Pres. and Gen. Mgr.; H. Palmer, Asst. Secy., all of Ochiltree, and W. R. Allen, Ch. Engr., Dalhart. (April 2, p. 774.)

GARDEN CITY, GULF & NORTHERN.—Organized in Kansas, with $1,000,000 capital and offices at Garden City, to build about 400 miles of railway. The projected route is from a point in Finney county northeast to Hill City. A branch is projected from a point north of Garden City northwest to St. Francis in Cheyenne county, also one from Garden City southerly to Plains or Liberal, thence in a northeasterly direction.

GRAND TRUNK PACIFIC.—The semi-annual report of the Grand Trunk under date of April 6 refers to the work on the Grand Trunk Pacific as follows: The erection of the important bridges at Battle river and Clover Bar, near Edmonton, has been finished, and track-laying is under way on the remaining section between Winnipeg and Edmonton, and will be finished during the present season. The section between Winnipeg and Lake Superior Junction is to be finished during the summer, giving a continuous line from Edmonton, Alb., east to Fort William on Lake Superior, about 1,250 miles, for the movement of this year's harvest.

An officer writes that branch lines will probably be built this year as follows: Yorkton branch, Melville, Sask., north to Yorkton, 40 miles; Regina branch, Melville southwest to Regina, 35 miles; Battleford branch, Biggar, Sask., north to Battleford, 49 miles; Calgary branch, Wainwright, Alb., southwest to Calgary, 50 miles. It is not likely that any construction work will be done this year on the Hudson Bay line. (April 30, p. 960.)

HUDSON & MANHATTAN.—The Public Service Commission, First district, has granted a franchise for the proposed extension to the Grand Central Station, at Forty-second street, New York City, and has authorized the execution of a contract with the company. The contract was accepted within twenty-four hours. It is understood that construction will begin within six months after receiving all necessary consents and will be completed within three years.

HUTCHINSON, HUNTSVILLE & WESTERN.—Organized in Kansas, with $250,000 capital and headquarters at Huntsville, to build from Hutchinson west via Huntsville to Hudson, with a number of branches, in all 75 miles.

IDAHO ROADS.—The Northwestern Lumber Co., Philadelphia, Pa., is planning to build a railway from the Grangeville branch of the Northern Pacific from Steunenberg, Idaho, and Cottonwood.

INDEPENDENCE NORTH & SOUTH.—Organized in Kansas, with $100,000 capital and headquarters at Kansas City and Independence, to build from a point in Wyandotte county south to near Caney, at the southern boundary of Montgomery county, with a number of branches and extensions, in all 200 miles.

KANSAS NORTHWESTERN.—An officer writes that the route will extend from Wichita, Kan., northwest via Hutchinson, Great Bend, Hayes, Hill City, Oberlin and Atwood to Benkelman, Neb., about 325 miles. Contracts for grading, tracklaying and bridges will be let in August or September. The country is comparatively level along the proposed route. There will be two or three steel bridges over the Arkansas, Smoky and Saline rivers. W. R. Crumpton, Ch. Engr., Great Bend, Kan. (April 30, p. 960.)

LAKEWOOD & SEASHORE (ELECTRIC).—Incorporated in New Jersey with $300,000 capital as a successor of the Trenton, Lakewood & Atlantic, organized to build from Trenton, N. J., east to a point on the Atlantic coast. The new company proposes to build from Lakewood east to Pt. Pleasant, about 10 miles. The incorporators include: C. R. LeCompte, H. J. Terwilliger, N. MacDonald, E. E. Le Compte, J. H. Butcher and R. A. Clark.

MEXICO TRANSPORTATION CO.—Organized by a Canadian syndicate to build from a point opposite El Paso, Tex., at Ciudad Juarez, Mex., south to Galena and Terrazas into the Murphy timber tract, in the state of Chihuahua, about 250 miles. The concession allows the taking over of certain of the properties formerly controlled by Col. W. C. Greene; also the property of the Sierra Madre Lumber Co. and some smaller properties, with permission to build additional lines. F. S. Pearson, Pres. and Cons. Engr., 25 Broad street, New York; Walter Dow, V.-Pres., Toronto, Ont., and E. D. Kenna, V.-Pres., Chicago, Ill.

NORTH COAST.—An officer writes that the contract, recently let to Messrs. Case, Eschbach & Dingle, for a 12-mile section of the line between Kiona, Wash., and Grandview, practically completes the grade from the Columbia river to Granger, Wash., about 60 miles. (April 23, p. 918.)

NORTHERN NEW BRUNSWICK & SEABOARD.—This company has obtained the charter of the Twin Tree Mines Railway Co., and has recently been granted permission by the New Brunswick legislature to change the name of the previous company and increase the capitalization to $1,000,000. Location surveys are being made between the Bathhurst mines on the Nipisguit river in New Brunswick and the three points of connection with the Grand Trunk Pacific, one near Bathhurst, one at Bartibog and the other at Red Pine. A subsidiary company, the New Brunswick Docks & Terminal Co., has been incorporated to build docks, terminals, etc., at Bathhurst, Newcastle or other points on the Baie Des Chaleurs and the Miramichi rivers.

Northwest Arkansas Electric Interurban Railway.—An officer writes that the projected route of this line, being built by the Arkansas Co-operation Construction Co., Bentonville, Ark., is from Joplin, Mo., south via Bentonville, to points in northwest Arkansas, total about 200 miles. W. Morris, Pres.; P. H. Sackett, Ch. Engr., Bentonville. (April 9, p. 821.)

North Yakima & Valley.—An officer writes that it is the intention to extend from North Yakima, Wash., north to Moxee, about 12 miles.

Oregon Electric.—It has been announced that the proposed extensions will not be undertken this summer, but that several thousand dollars will be spent in perfecting the present 70 miles of track between Portland, Ore., Salem and Forest Grove. These improvements will include ballasting and new equipment and several depots. Other extensions are projected from Salem to Albany, 30 miles, and from Tigard to Dallas, about 50 miles. (March 19, p. 656.)

Oregon Railroad & Navigation.—It is said that $1,000,000 will be spent during the coming summer in re-building sections of the main line along the Columbia river between The Dalles, Ore., and Umatilla, about 100 miles, the idea being to reduce curves and grades.

Quanah, Acme & Pacific.—An officer writes that this company is the successor to the Acme, Red River & Northern. The line is in operation from Acme, Tex., east via Quanah, for about nine miles, and an extension is being built from Acme southwesterly. Grading outfits are at work at various points on a section of about 50 miles, and track-laying is expected to be begun within 30 days. About 150,000 ties, 750,000 ft. of bridge timber and other lumber, also 5,000 tons of rails, are now on the way to the company's yards at Acme. Under a contract with the Pacific Construction Co. the first 50 miles is to be finished and ready for operation by Nov. 1, 1909. The line is to be laid with new 65-lb. open hearth rails. For the present the western terminus is to be at Paducah, in Cottle county. The line is eventually to be extended to Roswell, N. Mex., about 250 miles. Additional equipment has been bought and is now on the way. At the crossing on the Pease river in Cottle county there is to be a 1,000-ft. trestle, and to secure minimum grades on both sides of the river it will be necessary to remove about 100,000 cu. yds. of dirt on each side of the river. At Quanah improvements are to be made at a cost of $50,000, including roundhouses, shops and a combined station and office building. (April 30, p. 960.)

St. Louis, Oklahoma & Texas.—According to press reports, construction work will begin early in May. A company is now being organized to build the line from Honey Grove, Tex., southeast to Tyler, 125 miles. M J. Smith, Ch. Engr., McAlester, Okla. (April 23, p. 918.)

Short Line Traction.—Incorporated in Indiana to build an interurban line from the city limits of Indianapolis, Ind., to Beech Grove. This line is being built largely to accommodate traffic to and from the shops of the Big Four. The incorporators include: J. F. Webber, F. J. Edenharter and G. F. Mull, of Indianapolis.

Southern.—An officer writes regarding the resumption of work, that a short time ago all work was suspended on the line building from Winesap, Va., to Durmid, 7.05 miles, with the exception of the boring of a 1,300-ft. tunnel, the heading of which is now finished. Work has been resumed on the rest of the line, which will furnish a new line through Lynchburg, Va., crossing the James river at a height of about 150 ft., and having a maximum grade of 53 ft. northbound and 48 ft. southbound, with a maximum curvature of 3 deg. as compared with the existing line, which has a maximum grade of 74 ft. in both directions and a maximum curvature of 10 deg.

When work was closed down on the line between Asheville, N. C., and Craggy everything was about finished for the double track, with the exception of the new crossing of French Broad river near Asheville. Work is now under way at that place on a reinforced concrete viaduct to have 22 spans about 35 ft. each, center to center. (April 23, p. 918.)

Southern Pacific.—The Beaverton & Willsburg belt line, extending around the south side of Portland, Ore., will provide for handling freight which has heretofore been handled through one of the main streets of the city. Work is under way and is expected to be completed before fall. The work will necessitate bridging the Willimette river at Oswego. This bridge will be 80 ft. above the water. (March 19, p. 658.)

Southwestern Ohio Traction.—Organized in Ohio with $10,000 capital to operate about 400 miles of electric lines. The plans provide for merging a number of existing electric lines and building an entrance into Cincinnati to connect with a number of lines reaching many of the important towns in the southern part of Ohio. New lines and branches are projected. Application made to the City Council of Cincinnati for a franchise to build an underground, elevated and surface line from the center of the city to Norwood, six miles, with branch lines. This line is to have a grade not to exceed 1 per cent., and no grade crossings. Work is to be begun this summer. G. H. Worthington, Chairman, Cleveland, Ohio; John E. Bleekman, Pres.; W. L. Moyer, S. M. Jarvis, C. Hansel and J. L. Greatsinger, all of New York, are directors; Charles Hansel & Co., 43 Exchange place, New York, are the engineers in charge.

Spokane, Portland & Seattle.—The new line between Spokane, Wash., and Portland, Ore., was opened to operation on May 3. (April 30, p. 961.)

Terre Haute & Southwestern.—Surveys said to be under way for a line to form part of a system that is to extend from Terre Haute, Ind., southwest to the Fredericktown ore fields in Missouri. The plans call for a line from Terre Haute southwest to Mt. Vernon, Ill., 125 miles, where connection is to be made with the Wabash, Chester & Western, operating 64 miles to Chester and Menard, on the Mississippi river. The W., C. & W. will probably form part of the system. H. P. Taussig, of St. Louis, Mo.; C. D. Duffy, of Massachusetts, and the Terre Haute Commercial Club are interested.

Texas Roads.—W. P. Soash, of the Soash Land Co., Waterloo, Iowa, writes that surveys are now being made between Big Springs, Tex., and the new town of Soash. No contracts for grading, track-laying, bridges, etc., have yet been let. (April 16, p. 872.)

Timpson & Northwestern.—An officer writes that a contract has been given to extend this road to Henderson, Tex. Work to be started soon, and it is expected to have the extension in operation this year. When these improvements are finished the line will be between 35 and 40 miles long. At a meeting of the stockholders to be called in June the question of changing the name to the Timpson, Henderson & Northwestern, which is to have a capital of $250,000, will be considered. Arrangements made to apply for a new charter. (April 30, p. 961.)

Timpson, Henderson & Northwestern.—See Timpson & Northwestern.

Trenton, Lakewood & Atlantic.—See Lakewood & Seashore.

United Railways Co., Portland, Ore.—Operation of the first 13 miles between Portland, Ore., and Burlington, was begun on April 18. Construction work is under way on the additional 20 miles to Forest Grove and the line is projected to the Pacific coast, about 80 miles from Portland. This company has previously been doing terminal and switching business in Portland, operating by electricity.

Wabash, Chester & Western.—See Terre Haute & Southwestern.

Watervalley Southwestern.—Projected from Watervalley, Miss., on the Illinois Central, southeast to Calhoun City, on the Mobile & Ohio, about 40 miles. An officer writes that contracts for grading, track-laying, bridges, etc., have been let to the Union Contracting Co. (See Mississippi Roads, April 30, p. 961.)

Western Georgia.—Incorporated in Georgia, with $500,000 capitalization, to build from Aberdeen, Ga., west about 60 miles.

Railroad Financial News.

ATLANTA, BIRMINGHAM & ATLANTIC.—A second protective committee has been formed composed of E. S. Marston, Frederick Ayre, Samuel Carr and John I. Waterbury. The new committee is formed with a view to protect the interests of all classes of security holders.

BALTIMORE & OHIO.—See an article in regard to this company and the Cincinnati, Hamilton & Dayton in another column.

BOSTON & MAINE.—See an item about Boston's attitude toward Mr. Billard under General News.

CHICAGO & ALTON.—The $6,000,000 5 per cent. collateral trust notes of 1907 have been called for payment on July 1.

CHICAGO, ROCK ISLAND & PACIFIC.—See St. Louis, Brownsville & Mexico.

CINCINNATI, HAMILTON & DAYTON.—Judson Harmon, whose resignation as receiver has been accepted, effective May 1, has consented to continue to act as receiver until June 1. See an article in regard to this company and the Baltimore & Ohio in another column.

DENVER, NORTH WESTERN & PACIFIC.—Hallgarten & Co. and George H. Burr & Co., both of New York, have sold $4,000,000 6 per cent. notes of 1909-1911 of the Colorado-Utah Construction Co., guaranteed by D. H. Moffat, President of the Denver, North Western & Pacific. The notes are secured by the deposit of $8,000,000 first mortgage 4 per cent. bonds of the D., N. W. & P. See an item in regard to this company under General News.

ERIE.—The directors have accepted the conditions made by the New York Public Service Commission, Second district, in regard to an issue of $30,000,000 5 per cent. 30-year bonds. (April 23, page 912.)

GENEVA, CORNING & SOUTHERN.—Stockholders will vote May 29 on the question of approving a new lease of the company's property to the New York Central & Hudson River for the term of the corporate existence of the company, and also on a question of making a mortgage securing 4 per cent. bonds of the New York Central & Hudson River not to exceed $10,000,000. The proceeds of the bonds are to be used in adjusting present indebtedness, retiring outstanding bonds and making future betterments and extensions to the property of the G. C. & S.

KANSAS CITY SOUTHERN.—A special meeting of stockholders is to be held June 28 to authorize an issue of $21,000,000 5 per cent. bonds, of which it is planned to issue $10,000,000 at once. The proceeds are to be used to pay $5,100,000 notes maturing 1912 but callable on any interest date. The notes are to be called for payment July 1. The mortgage securing the $10,000,000 improvements bonds, $6,000,000 of which are deposited as collateral for the notes and the remaining $4,000,000 of which have never been issued, will be canceled. The proceeds of the new bonds above what is needed to pay off the notes are to be used for improvements, which will enable the road to handle to advantage the additional traffic expected to result from traffic agreements with the Union Pacific and the Southern Pacific.

NEW YORK CENTRAL & HUDSON RIVER.—See Geneva, Corning & Southern.

NEW YORK, NEW HAVEN & HARTFORD.—See an item about Boston's attitude toward Mr. Billard under General News.

ST. LOUIS, BROWNSVILLE & MEXICO.—Press despatches dated Chicago say that a special meeting of the directors has been called to arrange for the transfer of the property of the company to the Chicago, Rock Island & Pacific-St. Louis & San Francisco interests.

SOUTHERN RAILWAY.—J. P. Morgan & Co., New York, have bought $15,000,000 development and general mortgage 4 per cent. bonds, being the remainder of the $20,000,000 of these bonds originally pledged as collateral for convertible 6 per cent. notes due May 1, 1911, but callable in 1909. The notes are to be called for payment November 1, 1909.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Pennsylvania has ordered 24 electric locomotives, as mentioned in another column.

The International & Great Northern has ordered five 90-ton locomotives from the Baldwin Locomotive Works. These will be in service in about 60 days.

The Chesapeake & Ohio, previously reported as having ordered 35 locomotives from the American Locomotive Co., has increased this order to 50 locomotives.

The Temiskaming & Northern Ontario, reported in the *Railroad Age Gazette* of April 16 as being in the market for two 10-wheel passenger and four 10-wheel freight locomotives, has ordered this equipment from the Canadian Locomotive Co.

The Pennsylvania will build 44 new locomotives at its Juniata shops during 1909. These locomotives are additional to those reported in the *Railroad Age Gazette* of January 29. The present order includes 20 E-3-D passenger engines; 21 H-8-B freight engines and 3 B-8 switchers.

The Boston & Maine, as reported in the *Railroad Age Gazette* of April 30, has ordered 20 eight-wheel passenger, 20 mogul freight and 10 six-wheel switching locomotives from the American Locomotive Co.

General Dimensions.

	Eight-wheel.	Mogul.	Switching.
Weight on drivers	78,000 lbs.	122,800 lbs.	119,000 lbs.
Weight, total	119,000 "	142,400 "	119,000 "
Cylinders	18 in. x 24 in.	19 in. x 26 in.	19 in. x 24 in.
Diameter of drivers	69 in.	63 in.	51 in.
Boiler, type	Ext. wgn top, radial stay.	Ext. wgn top, radial stay.	Straight top, radial stay.
Boiler, wkg. stm. press.	190 lbs.	200 lbs.	160 lbs.
Heating surface, tubes.	1,613.5 sq. ft.	1,733.8 sq. ft.	1,480.4 sq. ft.
" " firebox	137.5 "	159.39 "	155.3 "
" " total.	1,751.0 "	1,893.19 "	1,635.7 "
Tubes, number	262	286	259
" outside diam.	2 in.	2 in.	2 in.
" length	11 ft. 7½ in.	11 ft. 8 in.	11 ft.
" material	Charcoal iron.	Charcoal iron.	Charcoal iron.
" maker	Worth Bros.	Worth Bros.	Worth Bros.
Firebox, type	Narrow, above frames.	Narrow, above frames.	Narrow, betwn frames.
" length	90 in.	108 $\frac{3}{16}$ in.	102 $\frac{3}{16}$ in.
" width	41 $\frac{5}{8}$ in.	40 $\frac{3}{8}$ in.	32 $\frac{1}{8}$ in.
" material	Steel.	Steel.	Steel.
" maker	Worth Bros.	Worth Bros.	Worth Bros.
Grate area	26 sq. ft.	30.2 sq. ft.	22.8 sq. ft.
Water capacity	4,000 gals.	5,000 gals.	4,000 gals.
Coal capacity	7 tons.	10 tons.	7 tons.

Special Equipment.

Axles	Carnegie Steel Co.
Boiler lagging	Ehret Mfg. Co.
Brakes	Westinghouse-American
Brake-beams	Buffalo
Brake-shoes	Am. Brake-Shoe & Fdry Co.
Couplers	Tower
Grease for driving boxes	Elvin
Headlight	F. O. Dewey Co.
Injector	Hancock, composite
Journal Bearings	Wm. A. Hardy & Sons
Piston and valve rod packings	Hayden Mfg. Co.
Safety valve	Ashton
Sanding devices	Hanlon
Springs	Railway Steel-Spring Co.
Steam gages	American
Tires	Midvale Steel Co.
Valve gear	Stephenson

The driving boxes of the eight-wheel and the mogul engines will be gun iron, made by the Hunt-Spiller Manufacturing Co., and those of the switchers will be made by the Atha Steel Castings Co. The eight-wheel and the switchers will have Detroit No. 21 sight feed lubricators. The eight-wheel and the switchers will have wheel centers made by the Atha Steel Castings Co., and those of the moguls will be steeled cast iron. The eight-wheel engines will be equipped with American balanced valves.

CAR BUILDING.

The Western Pacific is in the market for a number of passenger cars.

The Baltimore & Ohio is preparing specifications for a number of steel passenger cars.

The Northern Texas Traction Co., Ft. Worth, Tex., is in the market for 10 double-truck cars.

The Houston Electric Co., Houston, Tex., is reported in the market for 20 pay-as-you-enter cars.

The Central of New England, reported in the *Railroad Age Gazette* of April 30 as asking prices on six passenger cars, has given this order to the Wason Manufacturing Co.

The Pacific Electric Railway, Los Angeles, Cal., has ordered 50 thirty-ton side dump gondolas from the Hicks Locomotive & Car Works.

The Boston & Maine, previously reported as being in the market for 900 thirty-ton steel underframe box cars, has ordered 1,000 forty-ton drop-bottom steel coal cars from the Laconia Car Co.

The Salt Lake & Ogden (Electric), Salt Lake City, Utah, reported in the *Railroad Age Gazette* of April 30 as having ordered twelve 56-ft. cars, has ordered the trucks for these cars from the Baldwin Locomotive Works.

The Cleveland, Akron & Columbus 100 freight cars reported in the *Railroad Age Gazette* of February 5 as having been ordered from the Standard Steel Car Co., will have Kensington all-steel journal boxes manufactured by the Union Spring & Manufacturing Co., Pittsburgh, Pa.

The Pennsylvania 2,200 freight cars for the Lines West, reported in the *Railroad Age Gazette* of February 5 as having been ordered from the Cambria Steel Co., the Pressed Steel Car Co., the American Car & Foundry Co. and the Standard Steel Car Co., will have Kensington all-steel journal boxes manufactured by the Union Spring & Manufacturing Co., Pittsburgh, Pa.

The Chicago, Milwaukee & St. Paul, as reported in the *Railroad Age Gazette* of April 9, has ordered 67 passenger cars. These cars will be 10 ft. wide, 6 ft. 11 in. high from top of sill to bottom of plate, and 61 ft. long over end sills. The special equipment will include:

Bolsters, body	Cast steel
Brake-beams	Diamond special
Brake-shoes	Christie Congton
Brakes	Westinghouse
Couplers	Ohio
Draft rigging	Miner friction
Journal boxes	C., M. & St. P. standard
Side bearings	Hammered iron
Trucks	C., M. & St. P. standard
Curtain fixtures	Forsythe
Curtain material	Pantasote
Heating system	Vapor; Chicago Car Heating Co.
Varnish	Murphy
Vestibule	Pullman

IRON AND STEEL.

The St. Louis & Southwestern is in the market for about 7,000 tons of rails.

The Pennsylvania has ordered 5,400 tons of rails from the Carnegie Steel Co.

The Chesapeake & Ohio has ordered 8,000 tons of rails from the Illinois Steel Co.

The Gilmore & Pittsburg, building from Armstead, Mont., west to Salmon City, Idaho, has ordered 15,000 tons of open hearth rails from the Indiana Steel Co.

The Northern Pacific, reported in the *Railroad Age Gazette* of April 2 as being in the market for 5,000 tons of rails, has ordered this steel from the Illinois Steel Co.

The Denver & Rio Grande has ordered 600 tons of structural steel from the Richards-Noelke Co. This is for use on the Union passenger station at Salt Lake City, Utah.

The Pennsylvania Lines West, reported in the *Railroad Age Gazette* of April 23 as being in the market for structural steel for track elevation in Chicago, have ordered 1,100 tons from the Riter-Conley Construction Co.

General Conditions in Steel.—Indications are that a gradual improvement in steel is taking place although recent reports of orders and production have undoubtedly been exaggerated. It is understood that the United States Steel Corporation has decided upon a policy as to future prices and that no effort will be made to force quotations above their present level for some time to come. The prevailing price for steel bars will probably be $1.15 per 100 lbs., and $1.25 for shapes and plates. The lowest quotation since the change in price policy was $1.05 per 100 lbs. for steel bars and $1 for structural shapes. There has been a great deal of talk about cutting wages, but actual results show that this has been confined to a few independent companies. A despatch from Chicago says that the sales department of the Illinois Steel Company reports the Gary plant running below 50 per cent. of its capacity.

RAILROAD STRUCTURES.

Asheville, N. C.—See Southern Railway under Railroad Construction.

Chicago, Ill.—The Chicago River & Indiana will build a freight warehouse 100 ft. x 800 ft.

Fort Worth, Tex.—The Texas & Pacific has purchased equipment for a coaling station to be erected within 80 days. It will be located on the site of the old coal chutes destroyed by fire recently. The cost of the equipment will be about $30,000. (April 23, p. 921.)

Galveston, Tex.—Sealed proposals in duplicate will be received at the office of John M. Murch, Auditor of Galveston county, Tex., until June 28, 1909, for building a causeway across Galveston Bay between Galveston Island and Virginia Point. Proposals will be received for the causeway in its entirety or for any of the three sections, which include the arch bridge, the lift bridge and the roadway.

The entire causeway will be 10,642 ft. long. The arch bridge will be 2,472 ft. long; the lift bridge will have a clear span of 100 ft. and the roadway will be about 8,170 ft. long.

The plans and specifications may be seen and forms of proposals and contracts may be obtained at the offices of the County Engineer or County Auditor of Galveston county. Plans and specifications may also be seen at the offices of the Chief Engineer of the G. C. & S. F. at Galveston, Tex.; Bridge Engineer of the G. H. & S. A. at Houston, Tex.; Bridge Engineer of the A., T. & S. F. at Chicago; Stone & Webster, Boston, Mass., and the Concrete-Steel Engineering Co., Park Row building, New York. (July 31, page 641.)

Havre de Grace, Md.—Bids have been asked by the Pennsylvania Railroad for building a 300-ft. span and all other work necessary to improve the condition of the bridge over the Susquehanna river. The company has appropriated $95,000 for this work, which is to be completed by October 1.

Port Arthur, Tex.—The Gulf & Interstate has contracted for a wharf shed to be built, costing about $50,000.

Quanah, Tex.—See Quanah, Acme & Pacific under Railroad Construction.

Steubenville, Ohio.—The Wheeling & Lake Erie will build a new freight station.

Taylor, Tex.—The International & Great Northern has commenced work on its new roundhouse and shops. (Feb. 19, p. 383.)

Winnipeg, Man.—The Grand Trunk Pacific has given a contract to Haney, Quinlan & Robertson, contractors, for the substructure, and to the Dominion Bridge Co. for the superstructure of the proposed bridge over the Red river. The contract price for the sub-structure is $265,000 and for the superstructure $240,000. (May 6, p. 328.)

SIGNALING.

The Opelousas, Gulf & North Eastern has let a contract to the General Railway Signal Company for a mechanical interlocking plant at Rayne, La., where its line crosses the Southern Pacific. There will be a 28-lever Saxby & Farmer machine with 23 working levers. All home signals, including dwarfs, will be pipe-connected. On the O., G. & N. E. distant signals will be operated by electric motors, model 5, of the General Railway Signal Co.; on the Southern Pacific they will be style B, of the Union Switch & Signal Co. All signals will be two-position 60 deg. indicating in the lower right-hand quadrant. Electric detector, route and indication locking will be provided and no detector bars will be used. The General Railway Signal Co. will install the plant.

Supply Trade News.

The Jones Car Door Co., Chicago, has moved its offices to 1112-1113 Monadnock block.

The Ohio Seamless Tube Co., Shelby, Ohio, has commenced operating its new plant at Shelby. It is planned to produce 1,000 tons of steel tubes a month. (Feb. 12, p. 336.)

Charles L. Harris has been elected Third Vice-President of the Scullin-Gallagher Iron & Steel Co., St. Louis, Mo. Mr. Harris will also be Sales Manager, with office in St. Louis.

Muralt & Co., New York, have opened a branch office in the Temple Court building, Toronto, Ont. J. Engh, who has been connected with the firm for many years, will be in charge as Manager.

The Independent Pneumatic Tool Co., Chicago, has moved to its new building at 1307 Michigan avenue, where it will have larger space and better facilities for taking care of business.

The repair shop of the Crocker-Wheeler Co., Ampere, N. J., has been placed in charge of Edmund Lang, who for five years held an executive position with the Wheeler Condenser & Engineering Co.

The Pilliod Co., Swanton, Ohio, has been incorporated with $100,000 capital stock to make locomotive valve gears. The incorporators are Frederick E. Pilliod, John W. Crisman, Abner D. Baker, George P. Hahn and Sigmund Sanger.

The Chicago office of Peter Gray & Sons, Inc., Boston, Mass., has been moved to 303 Great Northern building, where a full line of samples of switch, semaphore and service lamps will be carried. The stock room will be at 57 Plymouth place.

The Federal Creosoting Co., Indianapolis, Ind., has been incorporated to engage in the business of creosoting railway ties. It has a capital stock of $250,000. The incorporators are Alvin T. Hert, Richard V. Cook and Harry W. Griffith.

The Lackawanna Bridge Co., Buffalo, N. Y., has been incorporated with $500,000 capital stock. The incorporators are Beverly L. Worden, Fordyce H. Bottom, Frank R. Bacon and Jacob E. Friend, of Milwaukee, Wis., and Ralph A. Kellogg, of Buffalo, N. Y.

Kensington all-steel journal boxes, made by the Union Spring & Manufacturing Co., Pittsburgh, Pa., have been specified for 2,200 freight cars recently ordered by the Pennsylvania Lines West and for 100 freight cars ordered by the Cleveland, Akron & Columbus.

The New York office of the Detroit Graphite Co., Detroit, Mich., has been moved to 135 Broadway, corner of Cedar street, where larger offices have been secured. In addition to the "Superior" graphite paint for steel, the company is manufacturing a complete line of durable colors for use on either wood or metal, to stand exposure and hard service.

The Northwestern Expanded Metal Co., Chicago, has discarded the method of designating expanded metal by mesh, gage and width of strand. It lacked flexibility, and, being confusing, led to mistakes. Hereafter prominence will be given to areas and weights, thus making expanded metal directly comparable with other forms of reinforcing material. The change is made for the convenience of customers and it is hoped that the use of words such as "regular" and "standard" will be discontinued.

The Cardwell Manufacturing Co., Chicago, announces that it has transferred its draft gear business to the Union Draft Gear Co., of which J. R. Cardwell is President, effective April 1, 1909. All orders for the Cardwell friction draft gear and all correspondence relative thereto should hereafter be addressed to the Union Draft Gear Co., Monadnock block, Chicago. The Union company, besides taking over the draft gear business of the Cardwell company, will make and sell other improved types of friction and spring draft gear appliances.

The Williams Boltless Rail Joint Manufacturing Co. has closed a deal whereby the manufacture and selling of its boltless rail joint, together with the Twentieth Century steel tie and the Oldham automatic car seal, has been taken over by Cortlandt F. Ames, of Chicago, who has been identified with the railway supply trade for a number of years. Emil Meyer, Assistant General Manager of the Williams company, will remain with Mr. Ames, who has moved his office from the Great Northern building to room 503 Manhattan building, Chicago.

The Westinghouse Machine Co., Pittsburgh, Pa., reports another very satisfactory month during April. The company received contracts averaging, in the turbine department alone, about one machine per day, some of them, like those for the San Francisco Electric Co., for 25,000 h.p., representing the largest of that type that have ever been made. Besides the turbine business, the demand for gas engines and reciprocating steam engines has also increased, while the new gas producer, which the company recently brought out, has opened a new line of inquiries that look exceedingly promising.

The Case Manufacturing Co., Columbus, Ohio, has changed its name to the Case Crane Co. The personnel of the company has not been changed and the manufacture of cranes, hoists, grab bucket machines, etc., will be continued. The company reports a satisfactory increase in its business during the last three months. Among recent shipments made are the following: One 15-ton bucket crane to the Cairo & St. Louis Railway, at Cairo, Ill.; three 40-ton cranes to the New York Edison Co., New York; three to the Commonwealth Edison Co., Chicago, and one 30-ton crane to the Cincinnati Traction Co.

The Climax Railway Supply Co., Canton, Ohio, the incorporation of which was announced in the *Railroad Age Gazette* of April 30, is a reorganization of the Climax Stock Guard Co., Chicago, and has taken over the selling agencies of several concerns. It is the exclusive representative in central territory of the Bonney-Vehslage Tool Co., New York, which manufactures a complete line of conductors' ticket punches. It is also agent for the Durand steel clothes locker and handles a full line of wheelbarrows, baggage wagons, trucks, shop, locomotive and push brooms, tie plugs, car journal packing, etc. The general sales office is at 570 Old Colony building, Chicago. The factory and general offices are at Canton, Ohio. The officers of the company are: President, H. B. Stewart; Vice-President, Howard P. Fulton; Secretary-Treasurer, William Simpson; General Manager, Fred V. Stewart.

Among orders recently received by the Philadelphia plant of the Link-Belt Company, Philadelphia, Pa., are the following: Cuba—Coal and ashes handling machinery for iron works; four gravity discharge elevators; miscellaneous elevating and conveying machinery for handling sugar; bituminous coal handling machinery. Florida—Elevators, conveyors and miscellaneous machinery for handling phosphate rock. New Jersey—Locomotive coaling station; machinery for handling linoleum batch; coaling chutes for retail coal pocket. New York—Retail coal pocket outfit; industrial system; coal handling machinery for railway. Nova Scotia—Ashes handling machinery; screening apparatus. Pennsylvania—Barrel elevator for brewery; slat conveyor for handling boxes; two gravel conveyors; elevators for handling large bales; miscellaneous tray elevator machinery; coal handling machinery for water-works.

TRADE PUBLICATIONS.

Anniversary Medal.—The Samson Cordage Works, Boston, Mass., is mailing a card which carries a small medal, which bears the dates of 1884 and 1909. The former date is that of the incorporation of the company.

Derailers.—Catalogue 101 of The Hobart-Allfree Co., Chicago, describes Smyth and Freeland clamp derailers. Halftone illustrations show the application, and there are suggestions for installing the derailers.

Coal and Ore Handling Machinery.—The C. W. Hunt Co., New York, has just issued catalogue No. 091, which is gotten out as an engineers' edition. The catalogue contains a large number of illustrations showing installations of coal and ore handling machinery in railway yards, coal docks, coal yards, etc.

Locomotive Boiler Tubes.—A folder distributed by the Detroit Seamless Steel Tube Co., Detroit Mich., presents "an object lesson in quality." It shows micro-photographs of common lap-welded steel pipe, a lap-welded locomotive flue and a Detroit seamless cold-drawn open-hearth steel locomotive flue, to illustrate the difference in density.

Chicago, Milwaukee & St. Paul.—A "Homeseekers' Excursion" poster has been received from this company. The fertility of the soil of Montana and other states of the Northwest through which the Coast Extension passes is pictured as being so remarkable that the farmer's plow in overturning the sod leaves a furrow of golden coin behind it. Homeseekers' rates to points in these states from eastern points along the line are listed on the poster.

Steam Shovels, Locomotive Cranes, Etc.—The Browning Engineering Co., Cleveland, Ohio, has issued a number of bulletins describing the various heavy railway construction tools which it manufactures, including: Bulletin No. 31 on the Browning lifting magnet; Bulletin No. 33 on revolving steam shovels; Bulletin No. 34 on automatic buckets; Bulletin No. 35 on locomotive cranes; Bulletin No. 36 on the Browning railway ditcher, and Bulletin No. 37 on scraper bucket excavators.

Mining Machinery, Electrical Equipment, Etc.—General Catalogue No. 60, which has been issued by Fairbanks, Morse & Co., Chicago, is the first general catalogue covering the majority of its lines that has ever been issued by this company. There has been included in it a great deal of information about the mining machinery and equipment which this concern makes. Special attention has been given to its electrical mine equipment for either alternating or direct-current. A large amount of space is also given to the various devices which are made especially for the railway trade. The volume contains 656 pages and is very completely indexed so that intending purchasers may readily find illustrated descriptions of any devices handled by this company that they may be seeking.

Car Lighting and Heating.—The Safety Car Heating & Lighting Co., New York, has just issued a very unique and comprehensive catalogue which is up-to-date in every way, in loose leaf form and contained in a handsome post binder. Several innovations are introduced in compiling the book, in that materials of like nature are gathered in separate sections: for instance, application of the Pintsch gas lighting apparatus, fittings, broilers, glassware, reflectors and electric bulbs, Pintsch flat flame lamps and Pintsch inverted mantle lamps. A complete line of artistic and adaptable single mantle lamps suitable for all classes of cars are illustrated in section H, which embodies both the elevations and sections of the lamps.

Among the devices which have been given special attention are the Axle Dynamo electric lighting system and the Thermo Jet system of heating. The Axle Dynamo electric lighting system (Section K) has been brought to its present state of efficiency after 16 years' experience with this form of car lighting and the equipment now offered for sale is said to embody all that makes for efficiency, reliability and economy in an equipment of this character. These equipments have performed excellent service on the Kansas City Southern, St. Louis Southwestern, Pennsylvania, Chicago, Rock Island & Pacific, Grand Trunk and New York, Chicago & St. Louis railways, and within the past few months orders have been booked for 70 equipments for the new Rock Island cars, 10 for Pullman cars, and 3 for Northern Pacific Railway cars. Many designs of electric fixtures are covered by section J. Section B not only treats of the Thermo Jet system, but also contains detailed descriptions and illustrations of the company's controllable direct steam and hot water systems, with accurate sectional cuts of the apparatus, such as jackets, automatic traps, regulating valves, end train pipe valves and fittings, specially adapted for the requirements. The Safety company's absolutely steam-tight couplers are considered in an equally complete way in section A.

Supply Men's Delegation.

The following are among those who composed the delegation of supply men which went to Springfield, Ill., last week. An account of this appears in another column.

George A. Post, President, Standard Coupler Co., New York.
A. H. Mulliken, President, Pettibone, Mulliken & Co., Chicago.
Rudolph Ortmann, President, Ajax Forge Co., Chicago.
Ward W. Willits, President, Adams & Westlake Co., Chicago.
F. B. Bradley, Vice-President, Ajax Forge Co., Chicago.
John M. Sellers, Vice-President, Sellers Manufacturing Co., Chicago.
James Viles, President, Buda Foundry & Manufacturing Co., Chicago.
J. G. Osgood, Chicago Pneumatic Tool Co., Chicago.
W. E. Clow, President, John B. Clow & Sons.
Robert F. Carr, President, Dearborn Drug & Chemical Wks., Chicago
Walter E. Miller, Vice-President, Fairbanks, Morse & Co., Chicago.
I. T. Hartz, President, Morden Frog & Crossing Works, Chicago.
W. L. Brown, Pickands, Brown & Co.
Henry S. Hawley, President, Railroad Supply Co., Chicago.
A. B. Scully, President, Scully Steel & Iron Co., Chicago.
Guilford S. Wood, Chicago.
L. L. Barth, Vice-President, Edward Hines Lumber Co., Chicago.
A. A. Sprague, 2d Director, Sprague, Warner & Co., Chicago.
J. J. Dau, Vice-President, Reid, Murdock & Co., Chicago.
J. B. Lord, President, Ayer & Lord Tie Co., Chicago.
G. V. Dickinson, Secretary, Elgin National Watch Co.
F. L. Wells, President, General Railway Supply Co., Chicago.
Joseph B. Terbell, Vice-President, American Brake Shoe & Foundry Co., Mahwah, N. J.
J. H. Whiting, President, Whiting F'dry Equipm't Co., Harvey, Ill.
P. F. Griffin, Vice-President Griffin Wheel Co., Chicago.
D. P. Donelson, President, Continental Bolt & Iron Works.
W. Morava, President, Morava Construction Co.
Horace Horton, President, Chicago Bridge & Iron Works, Chicago.
J. C. Kenny, Western Electric Co., Chicago.
W. P. Elliott, Jr., Vice-President, Pneumatic Gate Co., Chicago.
A. C. Moore, Manager, Safety Car Heating & L't'g Co., New York.
Severn P. Ker Vice-President, Republic Iron & Steel Co., Pittsburgh.
T. J. Hyman, Secretary, Illinois Steel Co., Chicago.
W. L. DeRemer, Vice-President, Spencer Otis Co., Chicago.
W. M. Turner, Director, Chicago Varnish Co., Chicago.
W. J. Spencer, Monmouth Coal Co.
Theodore Geissmann, Theodore Geissmann Co.
W. P. Rend, President, W. P. Rend & Co.
E. B. Leigh, President, Chicago Railway Equipment Co., Chicago.
Louis Benjamin, Vice-President, Block Pollak Iron Co., Chicago.
Frank Matthieson, Columbia Tool Steel Co.
Mark Ross, President, Pyle-National Electric Headlight Co., Chicago.
C. M. Baker, Murphy Varnish Co., Newark, N. J.
A. J. Babcock, Manning, Maxwell & Moore, Inc., New York.
L. O. Goddard, President, Star Coal Co.
H. B. Clow, President, Rand, McNally & Co., Chicago.
Egbert H. Gold, President, Chicago Car Heating Co., Chicago.
Edward P. Bailey, General Manager, National Malleable Castings Co., Cleveland, Ohio.
G. A. Berry, Vice-President, Hicks Locomotive & Car Works, Chicago.
Frank L. Holmes, A. C. Forbes & Co.
Geo. A. Ditewig, President, Maplewood Colliery Co.
R. H. Soller, Centralia Coal Co.
Frederick K. Maus, President, Kelley, Maus & Co., Chicago.
E. W. Heath, General Manager, Heath & Milligan Mfg. Co., Chicago.
W. White, President, National Boiler Washing Co., Chicago.
W. H. Whiteside, President, Allis-Chalmers Co., Milwaukee, Wis.
W. C. Winter, Pettibone, Mulliken & Co., Chicago.
August Ziesing, President, American Bridge Co., New York.
W. H. Forsyth, Secretary, Curtain Supply Co., Chicago.
George Mehring, Vice-President, L. H. Prentice Co.
Charles Dyer, Vice-President, Rodger Ballast Car Co., Chicago.
W. S. Carr, Secretary and Treasurer, McMaster Car Supply Co.
J. W. Motherwell, Manager, Ashton Valve Co., Boston, Mass.
C. L. Kennicott, President, Kennicott Water Softener Co., Chicago Heights, Ill.
E. L. Adreon, Jr., Vice-President and General Manager, American Brake Shoe & Foundry Co., Mahwah, N. J.
W. A. Smith, President, *Railway & Engineering Review.*
Martin Dunn, Managing Editor, *Railway Record.*
Samuel O. Dunn, Western Editorial Manager, *Railroad Age Gazette.*
L. B. Sherman, Western Manager, *Railroad Age Gazette.*
W. H. Elliott, Sec'y, Elliott Frog & Switch Co., East St. Louis, Ill.
F. E. Nulsen, Pres., Missouri Mall. Iron Works, East St. Louis, Ill.
Geo. Howard, Commonwealth Steel Co., St. Louis, Mo.
E. T. Vaughn, Standard Railway Equipment Co., St. Louis, Mo.
Mr. Pennington, Curtis Motor Truck Co., Decatur, Ill.
George R. Carr, Vice-Pres., Dearborn Drug & Chemical Wks., Chicago.
James McNally, Vice-President, Rand, McNally & Co., Chicago.
R. W. Crawford, President, Crawford Locomotive & Car Co.
Chas. A. Mason, Secretary, Pneumatic Gate Co., Chicago.
M. J. Trees, Chicago Bridge & Iron Works, Chicago.